



Jurisdictional Determination Report

Palmer Exploration Project

Constantine North, Inc.

Haines, Alaska

January 2018

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Appendix A: Wetland Determination Forms and Photographs

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Acronyms

ATV	All-Terrain Vehicle
CFR	Code of Federal Regulations
Constantine	Constantine North, Inc.
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
GIS	Geographic Information System
GPS	Global Positioning System
HDR	HDR, Inc.
HGM	Hydrogeomorphic
JDR	Jurisdictional Determination Report
NCRS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate Wetland
RPW	Relative Permanent Water
SPN	Special Public Notice
TNW	Traditional Navigable Water
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service



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1.0 Introduction and Purpose

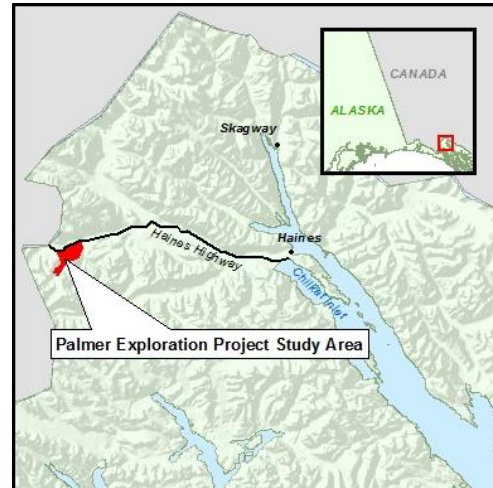
Constantine North, Inc. (Constantine), has contracted HDR, Inc. (HDR), to prepare a Jurisdictional Determination Report (JDR) in support of the Palmer Exploration Project (project) located north of Haines, Alaska. This JDR delineates and describes the wetlands and other waters of the U.S. within the study area.

The wetlands and other waters of the U.S. identified in this report are potentially subject to jurisdiction of the U.S. Army Corps of Engineers (USACE) under the authority of Section 404 of the Clean Water Act of 1972 (as amended) or Section 10 of the Rivers and Harbors Act of 1899. Information presented herein is intended to comply with the USACE guidance for jurisdictional determination reports, Special Public Notice (SPN) 2010-45 (USACE 2010).

HDR has conducted three prior wetland mapping tasks in support of the project. In 2013, HDR prepared a field-verified JDR for a 233-acre area along Glacier Creek (HDR 2013), and in 2015 and 2017, HDR prepared office-based mapping totaling approximately 12,800 acres (HDR 2015, 2017; Figure 1). The study area for this field-verified JDR surrounds the previous JDR effort and includes portions of the other office-based mapping efforts.

1.1 Study Area Description

The 2017 study area comprises approximately 4,580 acres northwest of Haines, along Glacier Creek from its headwaters to its confluence with the Klehini River (Inset 1), encompassing much of the Glacier Creek watershed. Access is via a maintained dirt road that enters from the east and then turns roughly southwest to parallel Glacier Creek and bisect the study area. Unmaintained dirt roads and all-terrain vehicle (ATV) trails run through the area as well. The study area extends approximately 5.5 miles from the southwest end to the northeast border, and approximately 1.8 miles north to south at its widest point. Location information is included in Table 1.



Inset 1: Location and Vicinity of Study Area

Table 1. Location Information for the Study Area

Latitude/Longitude (NAD83)	59°24'30.01"/-136°19'32.06"
Public Land Survey System	Sections, 23, 24, 25, 26, 34, 35, and 36; Township 28 South, Range 53 East, Copper River Meridian
	Sections 19, 20, 21, 28, 29, 30, 31, and 32; Township 28 South, Range 54 East, Copper River Meridian
	Sections 5 and 6; Township 29 South, Range 54 East, Copper River Meridian
U.S. Geological Survey Quadrangle	Skagway B-4

Table 1. Location Information for the Study Area

Watersheds	Little Boulder Creek-Klehini River and Glacier Creek
12-digit Hydrologic Unit Codes	190103031005 and 190103031002
Ecoregion ^a	Pacific Coastal Mountains
Major Land Resource Area ^b	Southern Alaska Coastal Mountains

^a Gallant et al. 1995

^b Natural Resources Conservation Service (NRCS) 2004

1.2 Regulatory Definitions

Wetlands, other waters of the U.S., and uplands (non-wetlands), as referenced in this report, are defined as follows:

Wetlands: “Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 Code of Federal Regulations [CFR] Part 328.3(b)). Wetlands are a subset of “waters of the U.S.” Note that according to the 1987 *Corps of Engineers Wetlands Delineation Manual (Wetlands Delineation Manual)* and in the 2007 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Regional Supplement; USACE 1987, 2007)*, wetlands must possess the following three characteristics: (1) a vegetation community dominated by plant species that are typically adapted for life in saturated soils, (2) inundation or saturation of the soil during the growing season, and (3) soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions.

Waters of the U.S.: In addition to wetlands, waters of the U.S. include other waterbodies regulated by USACE, including navigable waters, lakes, ponds, and streams.

Uplands: Non-water and non-wetland areas are called uplands.

2.0 Methods

2.1 Field Work

HDR wetland scientists Doug Jewell and Erin Cunningham conducted an on-site investigation of wetlands and waterbodies within the study area from July 19 to 22, 2017. Soil conditions, hydrology, and vegetation communities were studied using methods described in the 1987 *Wetlands Delineation Manual* and 2007 *Regional Supplement* (USACE 1987, 2007).

Standard USACE Wetland Determination Forms were completed at 19 sites. Photographs and observational data were collected at 43 additional Observation Points to document sites that exhibited characteristics similar to those areas where a data form had already been completed, or to document the presence of a waterbody or stream. Locations of both Wetland Determination Form and Observation Point sites were logged into a handheld global positioning system (GPS) unit and are shown on Figures 4 through 11.

2.2 Wetland Mapping and Classification

Upon returning from the field, scientists analyzed field-collected data and reviewed the following datasets in a Geographic Information System (GIS) to help delineate and classify wetlands and waterbodies in the study area:

- Digital color ortho-rectified aerial photography taken in July 2013, at sub-meter horizontal accuracy ground pixel resolution provided by Constantine (Constantine 2013).
- LiDAR-derived topographic contours and hillshade data, at 2-meter intervals, provided by Constantine (Constantine 2013).
- *Soil Survey for the Haines Area, Alaska* (NRCS 2005)
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) digital wetland mapping (USFWS 2017).

GPS locations of field-visited sites were overlaid on the aerial photography in GIS to identify and classify wetlands and other waters present within the study area. Aerial photography vegetation signatures from these field-visited sites were then extrapolated to similar locations throughout the study area, and wetland/upland boundaries were digitized into GIS. Delineating wetlands from aerial photography includes the following methods:

- *Vegetation clues:* Scientists examine aerial photographs for saturation-adapted vegetation communities; indicative canopy structure and height; and presence of hydrophytic plant species.
- *Evidence of soil saturation:* A site's proximity to streams, open water habitat, and marshes can be indicative of shallow subsurface water. Scientists, therefore, look for visible evidence of wetland hydrology, including surface water and darker areas of photos that indicate surface saturation.
- *Topography:* Evidence of topographic high points and sloped surfaces that would allow soils to drain supports the classification of areas as upland. Topographic depressions, toes of slopes, and flat topography serve as indicators of potentially poor soil drainage.

Wetlands and waterbodies were classified based on a review of field notes, data forms, and site photographs. Polygons identifying homogeneous wetland and waterbody areas in the GIS-based mapping were attributed with NWI mapping codes based on the USFWS's *Classification of Wetlands and Deepwater Habitats of the U.S.* (Cowardin et al. 1979).

3.0 Summary of Wetland Indicators

The vegetation, hydrology, and soil conditions described in this report are based on the field investigation conducted by HDR between July 19 and 22, 2017. Wetlands were identified in the field where scientists observed indicators of hydrophytic vegetation, wetland hydrology, and hydric soils. Of the 19 locations where a data form was completed, seven were determined to be wetland. Of the 12 remaining upland sites, one met the criteria for both hydric soil and hydrophytic vegetation but did not meet the criteria for wetland hydrology, four sites met only the criteria for hydrophytic vegetation, and the other seven upland sites did not meet any of the three criteria required to be a wetland. Table 2 summarizes the Wetland Determination Form sites. The completed Wetland Determination Forms and photographs taken at each site are included in Appendix A.

In addition to the 19 locations where Wetland Determination Forms were completed, 43 Observation Points were documented. Observational data was collected at these points to describe the wetland or

upland status of the community sampled, or to document the presence of a waterbody or stream feature. Photographs taken at each Observation Point are included in Appendix B.

Table 2. Summary of Wetland Determination Form Sites

Plot Number	Latitude	Longitude	NWI Code ^a	HGM Class ^b	Hydrophytic Vegetation	Hydric Soils	Wetland Hydrology
085	59.42424	-136.29431	U	N/A	-	-	-
100	59.42311	-136.28477	U	N/A	-	-	-
113	59.41869	-136.28781	PSS1/EM1B	Slope	X	X	X
114	59.41885	-136.28784	PSS1/EM1B	Slope	X	X	X
116	59.41903	-136.28941	U	N/A	X	-	-
117	59.41905	-136.29016	U	N/A	X	-	-
125	59.40562	-136.28241	PEM1F	Slope	X	X	X
127	59.40627	-136.28276	PSS1/EM1C	Slope	X	X	X
131	59.40671	-136.28311	U	N/A	X	-	-
132	59.40657	-136.28299	PSS1/EM1B	Slope	X	X	X
134	59.40572	-136.28073	PFO4/SS1C	Slope	X	X	X
135	59.42373	-136.24394	U	N/A	X	X	-
147	59.42783	-136.28159	U	N/A	-	-	-
148	59.42948	-136.27487	U	N/A	-	-	-
152	59.42566	-136.27033	U	N/A	-	-	-
154	59.42197	-136.24547	U	N/A	X	-	-
156	59.42150	-136.24530	U	N/A	-	-	-
157	59.38641	-136.37317	U	N/A	-	-	-
181	59.42246	-136.23981	PFO4/SS1B	Riverine	X	X	X

^a Source: Cowardin et al. 1979; see Table 7 for NWI code descriptions.

^b Source: Brinson 1993

3.1 Vegetation

A list of the dominant vascular plant species observed in the study area during the field investigation and their indicator status is provided in Table 3 (Lichvar et al. 2016). Synonyms of plant species names that were recorded in the field on Wetland Determination Forms are also included in Table 3. The dominant plant species were identified by using the “50/20 Rule” from the *Regional Supplement* (USACE 2007).

In total, 12 of the 19 sites where Wetland Determination Forms were completed met the requirements for hydrophytic vegetation, through either the dominance test or the prevalence index. Hydrophytic

vegetation was not always correlated with a wetland, as five sites with hydrophytic vegetation did not meet the remaining criteria to be classified as wetland.

Table 3. Dominant Plant Species and Alaska Regional Indicator Status

Scientific Name (Synonym)	Common Name	Indicator Status ^a	Scientific Name (Synonym)	Common Name	Indicator Status ^a
<i>Alnus viridus</i> (<i>Alnus sinuata</i>)	Sitka alder	FAC	<i>Oplopanax horridus</i>	devil's club	FACU
<i>Aruncus dioicus</i>	goatsbeard	UPL	<i>Picea sitchensis</i>	Sitka spruce	FACU
<i>Athyrium cyclosorum</i> (<i>Athyrium felix-femina</i>)	western lady fern	FAC	<i>Populus trichocarpa</i>	black cottonwood	FACU
<i>Anemone parviflora</i>	smallflowered anemone	FACU	<i>Pyrola asarifolia</i>	liverleaf wintergreen	FACU
<i>Betula glandulosa</i>	resin birch	FAC	<i>Ribes lacustre</i>	prickly currant	FAC
<i>Bromus sitchensis</i>	Alaska brome	NL	<i>Rubus chamaemorus</i>	cloudberry	FACW
<i>Calamagrostis canadensis</i>	bluejoint reedgrass	FAC	<i>Rubus spectabilis</i>	salmonberry	FACU
<i>Carex aquatilis</i>	water sedge	OBL	<i>Salix barclayi</i>	Barclay's willow	FAC
<i>Carex buxbaumii</i>	Buxbaum's sedge	FACW	<i>Salix glauca</i>	grayleaf willow	FAC
<i>Chamerion angustifolium</i> (<i>Epilobium angustifolium</i>)	narrow-leaf fireweed	FACU	<i>Salix pulchra</i>	tealeaf willow	FACW
<i>Circaea alpine</i>	enchanter's nightshade	FACW	<i>Salix sitchensis</i>	Sitka willow	FAC
<i>Cornus canadensis</i>	bunchberry dogwood	FACU	<i>Sanguisorba canadensis</i>	Canadian burnet	FACW
<i>Cornus sericea</i> (<i>Cornus stolonifera</i>)	redosier dogwood	FAC	<i>Senecio triangularis</i>	arrowleaf ragwort	FACW
<i>Dryas drummondii</i>	yellow dryas	FACU	<i>Shepherdia canadensis</i>	soapberry	FACU
<i>Elymus glaucus</i>	western ryegrass	FACU	<i>Trichophorum cespitosum</i>	tufted bulrush	OBL
<i>Equisetum arvense</i>	field horsetail	FAC	<i>Tsuga heterophylla</i>	western hemlock	FAC
<i>Equisetum fluviatile</i>	water horsetail	OBL	<i>Tsuga mertensiana</i>	mountain hemlock	FAC
<i>Equisetum pratense</i>	meadow horsetail	FACW	<i>Urtica dioica</i>	stinging nettle	FACU
<i>Equisetum variegatum</i>	variegated scouringrush	FACW	<i>Vaccinium alaskaense</i>	Alaska blueberry	FAC
<i>Erigeron peregrinus</i>	subalpine fleabane	FACW	<i>Vaccinium uliginosum</i>	bog blueberry	FAC
<i>Gymnocarpium dryopteris</i>	western oakfern	FACU	<i>Valeriana sitchensis</i>	Sitka valerian	FAC
<i>Heracleum lanatum</i>	cowparsnip	FACU	<i>Viburnum edule</i>	squashberry	FACU
<i>Leptarrhena pyrolifolia</i>	fireleaf leptarrhena	FACW	<i>Viola langsdoeffii</i>	Aleutian violet	FACW
<i>Menziesia ferruginea</i>	rusty menziesia	FACU			

^a Wetland Indicator Status (Lichvar et al. 2016). **FAC**: Facultative - species equally likely to occur in wetlands and non-wetlands; **FACU**: Facultative Upland - species usually occurs in non-wetlands; **FACW** - Facultative Wetland - species usually occurs in wetlands; **OBL**: Obligate Wetland - species almost always occurs under natural conditions in wetlands; **NL**: Not Listed – species not listed in the State of Alaska 2016 Wetland Plant List.

3.2 Soils

The *Soil Survey of the Haines Area, Alaska* soil mapping (NRCS 2005) covers approximately 87 percent of the study area, as shown in Figure 1. Of the soil map units identified in the study area, three are shown to include hydric components and are either poorly drained or somewhat poorly drained, as shown in Table 4.

Table 4. Haines Area Soil Series Units Located in Study Area

Soil Map Unit ID#	Soil Name/Drainage Class	Percent Hydric Composition	Hydric Composition Landform
109	Histic Cryaquepts / Poorly drained	100	Depressions
110	Hollow and Skagway soils / Somewhat poorly drained	100	Flood plains
115, 116, 117	Kupreanof-Foad complex / Well drained	0	Mountains
121	Lutak-Kupreanof association / Well drained	0	Terraces / Mountains
124	Riverwash	N/A	Floodplains
130	Rock outcrop-Tolstoi-Foad complex / Well drained	0	Mountains
134, 135, 140	Tolstoi-Foad complex / Well drained	0	Mountains
142	Tsirku-Hollow-Funter complex / Somewhat poorly drained (Tsirku, Hollow) / Very poorly drained (Funter)	90	Floodplains (Tsirku, Hollow), Depressions on terraces and floodplains (Funter)
147	Water, fresh	N/A	Waterbodies

Site-specific soil characteristics were documented at each of the 19 Wetland Determination Form sites and are summarized in Table 5. Eight of the 19 Wetland Determination Form sites had hydric soils. Three hydric soil indicators were detected during the field investigation: histosols (six sites), hydrogen sulfide odor within the upper 12 inches of the soil surface (four sites), and Alaska Redox (two sites). One of the sites (Site 135) exhibited the Alaska Redox indicator, but was determined upland due to lack of wetland hydrology. The 11 Wetland Determination Form sites that lacked hydric soil indicators were classified as upland. These sites generally had shallow (less than 6 inches) organic horizons, and were composed of well-drained sand or silt, often with gravels and/or cobbles.

Table 5. Hydric Soil Indicators at Data Collection Sites

Site	Histosol	Hydrogen Sulfide	Alaska Redox	Hydric Soil Present?
085	-	-	-	No
100	-	-	-	No
113	X	X	-	Yes
114	X	X	-	Yes
116	-	-	-	No
117	-	-	-	No
125	X	X	-	Yes

Table 5. Hydric Soil Indicators at Data Collection Sites

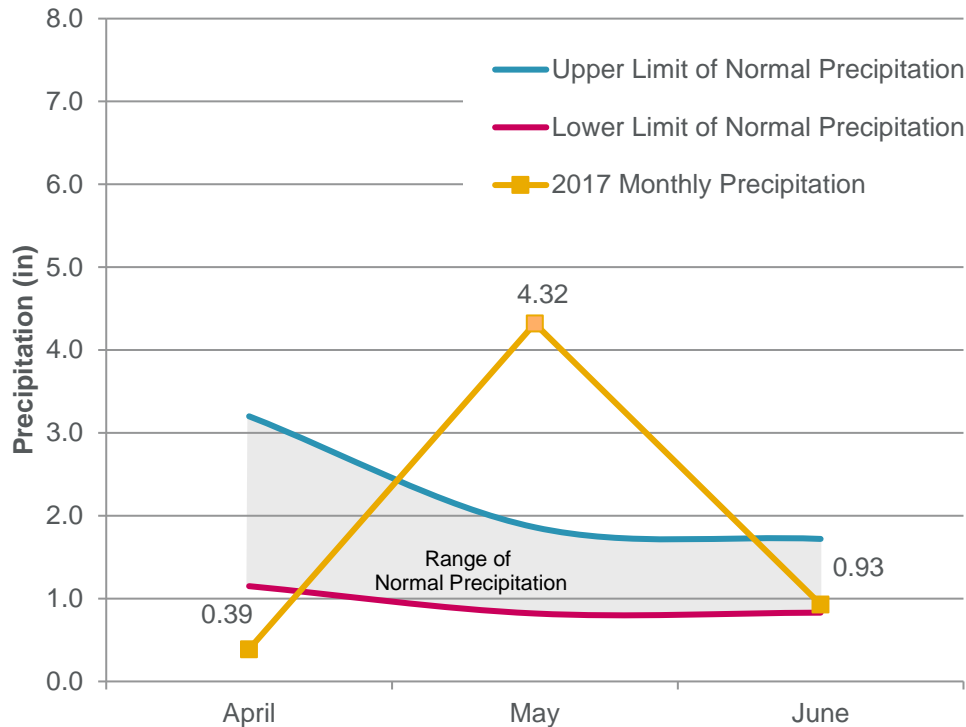
Site	Histosol	Hydrogen Sulfide	Alaska Redox	Hydric Soil Present?
127	X	X	-	Yes
131	-	-	-	No
132	X	-	-	Yes
134	X	-	-	Yes
135	-	-	X	Yes
147	-	-	-	No
148	-	-	-	No
152	-	-	-	No
154	-	-	-	No
156	-	-	-	No
157	-	-	-	No
181	-	-	X	Yes
TOTAL	6	4	2	8

Specific information about the soil horizons and hydric soil indicators (e.g., depth of organic horizon) can be found on the data forms included in Appendix A. These indicators are further described in the 2007 *Regional Supplement* (USACE 2007).

3.3 Hydrology

Precipitation data for the 3 months prior to the July 19–22 field investigation was reviewed to determine the degree to which any recent weather (e.g., abnormal wet or dry conditions) may have influenced field hydrology. Climate data for the surrounding region was obtained from the Haines AP weather station at the Haines Airport, located approximately 30 miles southeast of the study area.

The monthly precipitation totals preceding the field visit were then compared to the normal ranges of monthly precipitation derived from 1971 to 2000 using the NRCS *Engineering Field Handbook* method (NRCS 1997, 2017). This method weights the data by both the amount of precipitation and the relative age of a rainfall event. The results of the comparison are shown in Inset 2. Although May precipitation totals were well above the normal range, the NRCS method calculates the antecedent precipitation prior to the field work as normal.

Inset 2: Antecedent Precipitation Compared to Normal Precipitation Range for Haines Airport


Seven of the 19 Wetland Determination Form sites showed indicators of wetland hydrology. All seven of those displayed primary indicators of a high water table and saturation within the upper 12 inches of the soil surface. The second-most common primary hydrology indicators were the presence of surface water and inundation visible on aerial imagery. The most common secondary indicator met was a positive FAC-neutral test in four of the seven sites. The primary and secondary indicators of hydrology met at each site are shown in Table 6. All sites with wetland hydrology were determined to be wetland.

Specific information about the wetland hydrology indicators (e.g., depth to saturation within the soil pit) can be found on the data forms included in Appendix A. These indicators are further described in the 2007 *Regional Supplement* (USACE 2007).

Table 6. Wetland Hydrology Indicators at Data Collection Sites

Site	Primary Indicators							Secondary Indicators				Wetland Hydrology Present?
	Surface Water	High Water Table	Saturation	Algal Mat or Crust	Iron Deposits	Inundation on Aerial Imagery	Hydrogen Sulfide Odor	Drainage Patterns	Stunted/Stressed Plants	Geomorphic Position	FAC-Neutral Test	
085	-	-	-	-	-	-	-	-	-	-	-	No
100	-	-	-	-	-	-	-	-	-	-	-	No
113	X	X	X	-	-	-	X	X	-	-	-	Yes
114	-	X	X	-	-	-	X	-	-	-	-	Yes

Table 6. Wetland Hydrology Indicators at Data Collection Sites

Site	Primary Indicators							Secondary Indicators				Wetland Hydrology Present?
	Surface Water	High Water Table	Saturation	Algal Mat or Crust	Iron Deposits	Inundation on Aerial Imagery	Hydrogen Sulfide Odor	Drainage Patterns	Stunted/Stressed Plants	Geomorphic Position	FAC-Neutral Test	
116	-	-	-	-	-	-	-	-	-	-	-	No
117	-	-	-	-	-	-	-	-	-	-	-	No
125	X	X	X	X	X	X	X	X	-	X	X	Yes
127	X	X	X	-	-	-	X	-	-	-	X	Yes
131	-	-	-	-	-	-	-	-	-	-	-	No
132	-	X	X	-	-	-	-	-	-	-	-	Yes
134	X	X	X	-	-	-	-	-	X	X	X	Yes
135	-	-	-	-	-	-	-	-	-	-	-	No
147	-	-	-	-	-	-	-	-	-	-	-	No
148	-	-	-	-	-	-	-	-	-	-	-	No
152	-	-	-	-	-	-	-	-	-	-	-	No
154	-	-	-	-	-	-	-	-	-	-	X	No
156	-	-	-	-	-	-	-	-	-	-	-	No
157	-	-	-	-	-	-	-	-	-	-	-	No
181	-	X	X	-	-	-	-	-	-	-	-	Yes
TOTAL	4	7	7	1	1	4		2	1	2	4	7

4.0 Wetland and Waterbody Classification

Wetlands were identified where wetland scientists observed indicators of hydrophytic vegetation, wetland hydrology, and hydric soils. If any of these three requirements are not met under normal conditions, the site does not meet the USACE criteria for being classified as a wetland. Waterbodies were identified to their ordinary high water mark using procedures outlined in Regulatory Guidance Letter 05-05.

Wetland/upland determinations were made at 19 sites where Wetland Determination Forms were completed and at 43 Observation Points.

4.1 Forested Wetlands

Approximately 13.6 acres of needle-leaved evergreen forested wetlands (less than 1 percent) are found in the study area. Forested wetlands are found in beaver-flooded areas near the confluence of Glacier Creek with the Klehini River and near the eastern edge of the study area, as well as on the edges of the slope wetland complexes in the southern part of the study area.

Vegetation in forested wetlands is typically dominated by Sitka spruce and western and mountain hemlock. These communities also have at least a 30 percent composition of scrub-shrub vegetation in the understory. Dominant shrub species include deciduous species such as alder and willow, as well as spruce and hemlock saplings.

Forested wetlands in the study area are either saturated, seasonally flooded, or permanently flooded (due to beaver activity). Soils in the seasonally flooded forested wetlands on the edge of the wetland complex in the southern part of the study area (Site 134, Inset 3) had an organic surface layer at least 18 inches deep, meeting the definition of a histosol, while gleyed soils with Alaska Redox were present in the saturated forested wetland near the eastern border of the study area (Site 181).

4.2 Scrub-Shrub Wetlands

Broad-leaved deciduous scrub-shrub (PSS1) wetlands are the most common types of wetlands in the study area, occupying approximately 52.0 acres (approximately 1 percent). These wetlands are found along stream banks, in beaver-influenced flooded areas and in areas of slope discharge.

Vegetation is typically dominated by alder and willow species, or devil's club. Vegetation in the herbaceous stratum generally comprise at least 30 percent of the total vegetation cover. Dominant emergent species include western lady fern and bluejoint reedgrass (Inset 4).

Scrub-shrub wetlands mapped within the study area typically have either a saturated or seasonally flooded hydrologic regime. Soils at each of the scrub-shrub determination form sites are composed of at least 16 inches of organic material (Histosol), with most sites also having a hydrogen sulfide present in the upper 12 inches of the soil surface.

4.3 Emergent Wetlands

Persistent emergent (PEM1) wetlands comprise 7.8 acres (less than 1 percent) of the study area. The majority of these wetlands are near the southern boundary of the study area, in two wetland complexes on a terraced, north-facing slope (Inset 5).

Dominant emergent vegetation species include tufted bulrush and Buxbaum's sedge, as well as scrub-shrub species such as resin birch and cloudberry. Trees are sparse in emergent wetlands in the study area.



Inset 3: Seasonally flooded needle-leaved forested/deciduous scrub-shrub wetland at Site 134 (PFO4/SS1C)



Inset 4: Saturated broad-leaved deciduous scrub-shrub/persistent emergent wetland at Site 113 (PSS1/EM1B)



Inset 5: Semi-permanently flooded persistent emergent wetland at Site 125 (PEM1F)

Approximately 90 percent of emergent wetlands mapped within the study area have a semipermanently flooded hydrologic regime. These areas have surface water to a depth of approximately 12 inches and are typically wetter than the immediately surrounding scrub-shrub and forested vegetation communities. Soils at the data form site located in a semipermanently flooded emergent wetland (Site 125) consisted of a Histosol and also had a hydrogen sulfide odor within the upper 12 inches of the soil surface.

4.4 Waterbodies

Waterbodies account for approximately 4 percent or 185.9 acres of the study area. Waterbodies in the study area were classified as either streams or ponds.

4.4.1 Streams

Both perennial and intermittent streams are found within the study area. The dominant drainage pattern in the study area is from the ridge on the south side of the area north and northeastward toward Glacier Creek and the Klehini River. The area north of the access road and east of Glacier Creek is a large alluvial fan composed mainly of well-drained coarse soils. Multiple intermittent and perennial streams (such as the one shown in Inset 6) originate as seeps in the steeper forested terrain in the north part of the study area and flow into this alluvial fan area, where soils are well-drained and the streams appear to go subsurface.

Beaver activity has influenced multiple streams in the study area, leading to flooding of surrounding areas. Approximately 9.6 acres of the study area's wetlands and waterbodies are affected by beaver activity. Inset 7 shows an aerial overview photo of beaver-caused flooding at the Glacier Creek confluence with the Klehini River.

4.4.2 Ponds

There are eight permanently flooded ponds in the study area with unconsolidated bottoms. They total approximately 3.0 acres, less than 1 percent of the study area. Three of the ponds are excavated out of uplands, one of which is shown in Inset 8. No surface water inlets or outlets were found at any of the excavated ponds.



Inset 6: Permanently flooded upper perennial unconsolidated bottom stream at Site 171 (R3UBH)



Inset 7: Aerial photograph of beaver-caused flooding near the confluence of Glacier Creek and the Klehini River



Inset 8: Permanently flooded unconsolidated bottom excavated pond at Site 081

4.5 Uplands

Uplands account for approximately 94 percent or 4,320.3 acres of the study area. Upland vegetation communities are forested, scrub-shrub, and (less often) emergent dominated. Forested communities were mostly dominated by Sitka spruce and western hemlock, while upland scrub-shrub plant communities were dominated by willow and alder species, as well as devil's club, Canadian bunchberry, and other facultative and facultative upland species. Scrub-shrub vegetation often forms dense thickets in the study area with herbaceous species such as stinging nettle. Hydrophytic vegetation is present at five of the 12 upland sites, demonstrating that the vegetation community is not always the determining factor between uplands and wetlands in the study area. An example of open hemlock forest upland vegetation is shown in Inset 9.

Soils at most upland sites were generally silty or sandy and well-drained, with no indicators of hydric soil. One upland site, however, at wetland data form Site 135, displayed primary indicators of hydrophytic vegetation and hydric soil, but no indicators of wetland hydrology. Both vegetation and soil indicators were borderline at the site, with many facultative upland plant species present and only 10 percent redox concentrations present in the soil (the minimum amount needed to meet the Alaska Redox indicator). This site appears to be a remnant streambed, and while some inundation may occur due to snowmelt, it is not expected that it persists long enough into the growing season for this site to be determined wetland. No hydrology indicators were present at the other upland sites.



Inset 9: Upland open hemlock forest at Site 100

Multiple disturbed upland areas are present in the northeastern study area, likely from logging activities. A number of unmaintained dirt roads, now utilized as ATV trails due to the regrowth of vegetation, cross the area. Invasive and non-native species such as sweetclover (*Melilotus officinalis*) and common dandelion (*Taraxacum officinale*) were observed in disturbed areas.

5.0 Wetland Mapping Results

Wetland/upland determinations were made at 19 sites where Wetland Determination Forms were completed and at an additional 43 sites where Observation Points were documented.

Approximately 259.3 acres (approximately 6 percent) of the 4,579.6-acre study area was identified as wetlands and waterbodies. Wetland types include forested, scrub-shrub, and emergent wetlands. The remaining 4,320.3 acres of the study area was identified as upland. Wetland and waterbody classes found within the study area and acreages of each NWI classification type are provided in Table 7.

Table 7. Wetland, Waterbody, and Upland Mapping Summary		
NWI Code	Description	Acres
Forested Wetlands		
PFO4/SS1B	Saturated needle-leaved evergreen/deciduous scrub shrub wetland	11.6
PFO4/SS1C*	Seasonally flooded needle-leaved evergreen/deciduous scrub-shrub wetland	2.0
Total Forested Wetlands		13.6
Scrub-Shrub Wetlands		
PSS1A	Temporarily flooded broad-leaved deciduous scrub-shrub wetland	10.8
PSS1B*	Saturated broad-leaved deciduous scrub-shrub wetland	11.2
PSS1C*	Seasonally flooded broad-leaved deciduous scrub-shrub wetland	9.2
PSS1F*	Semipermanently flooded broad-leaved deciduous scrub-shrub wetland	0.6
PSS1/EM1B	Saturated broad-leaved deciduous/scrub-shrub/persistent emergent wetland	6.7
PSS1/EM1C	Seasonally flooded broad-leaved deciduous/scrub-shrub/persistent emergent wetland	13.4
PSS1/EM1F	Semipermanently flooded broad-leaved deciduous/scrub-shrub/ persistent emergent wetland	0.1
Total Scrub-Shrub Wetlands		52.0
Emergent Wetlands		
PEM1B	Saturated persistent emergent wetland	0.2
PEM1C	Seasonally flooded persistent emergent wetland	0.8
PEM1F	Semipermanently flooded persistent emergent wetland	6.8
Total Emergent Wetlands		7.8
Ponds		
PUBH	Permanently flooded unconsolidated bottom pond	2.3
PUBHx	Permanently flooded unconsolidated bottom excavated pond	0.7
Total Ponds		3.0
Streams and Gravel Bars		
R2UBH	Permanently flooded lower perennial unconsolidated bottom stream	3.9
R2UBH/USA	Permanently flooded lower perennial unconsolidated bottom stream and associated temporarily flooded gravel bars	17.5
R2UBH/USC	Permanently flooded lower perennial unconsolidated bottom stream and associated seasonally flooded gravel bars	22.3
R2USA	Temporarily flooded lower perennial stream gravel bars	32.1
R3UBH*	Permanently flooded upper perennial unconsolidated bottom stream	3.2
R3UBH/USA	Permanently flooded upper perennial unconsolidated bottom stream and associated temporarily flooded gravel bars	101.3
R3UBH/USC	Permanently flooded upper perennial unconsolidated bottom stream and associated seasonally flooded gravel bars	1.1

Table 7. Wetland, Waterbody, and Upland Mapping Summary

NWI Code	Description	Acres
R3USC	Seasonally flooded upper perennial stream gravel bars	1.5
Total Streams		182.9
<i>18*Includes NWI types denoted with modifier "b" in mapping, indicating the influence of beaver activity (i.e., flooding).</i>		
Total Wetland and Other Waters of the U.S.		259.3
Uplands		4,320.3
Total Study Area		4,579.6

Streams that were too small to be mapped as polygons in GIS were mapped as linear features. These stream types and the linear miles of each are summarized in Table 8.

Table 8. Stream Line Mapping Summary

NWI Code	Description	Linear Miles
R3UBH	Permanently flooded upper perennial unconsolidated bottom stream	14.1
R4SBC	Seasonally flooded intermittent stream	7.4
Total Streams		21.5

Figures 4 through 11 display the wetland, upland, and waterbody boundaries, and the boundaries between different wetland and waterbody types identified in the study area. Locations of the Wetland Determination Form sites and Observation Points collected during the fieldwork are also shown on the figures.

6.0 Jurisdictional Status

This wetland delineation was prepared in compliance with the *USACE Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement* (USACE 2007). The on-site determination conducted by HDR from July 19 to 22, 2017, indicates that of the total 4,579.6 acres in the study area, there are approximately 259.3 acres of potentially jurisdictional wetlands or waterbodies and approximately 21.5 linear miles of streams potentially subject to USACE regulations.

Based on the current USACE guidance on jurisdiction, the USACE will assert jurisdiction over Traditional Navigable Waters (TNWs), wetlands adjacent to TNWs, relatively permanent waters (RPWs) that flow into TNWs, and wetlands that abut those RPWs. RPWs are defined as those tributaries that have flow year-round or at least seasonally (e.g., typically 3 months; USEPA and USACE 2008).

A case-by-case analysis will be conducted by USACE for all wetlands that do not abut an RPW, but are bordering, contiguous or neighboring an RPW. A number of the naturally-occurring wetlands and waterbodies in the study area do not abut or have a direct surface water connection to TNWs or RPWs that flow into TNWs. However, due to their close proximity to jurisdictional waters (most study area wetlands are within 1,000 feet of a RPW) USACE would likely consider most naturally-occurring wetlands and waterbodies (258.4 acres and 21.0 miles of streams) within the study area either an RPW or neighboring an RPW and would therefore likely assert their jurisdiction under Section 404 of the Clean Water Act.

The small depressional wetland (0.3 acre) represented by Site 112 lacks a surface water inlet or outlet and is surrounded by uplands. Five streams in this area represented by Sites 109, 110, 111, 123, 124, 169, 170, and 171 totaling 0.5 linear mile originate as seeps and appear to go subsurface into well-drained soils, lacking a surface water connection to downgradient wetlands or waterbodies. Based on interpretation of topographic data, the hydraulic gradient in this area appears to be north or northeast. The nearest wetland or waterbody to the north is the Klehini River, which is located more than 2,900 feet from these streams. It is unlikely that these features have a chemical, biological, or physical connection to Glacier Creek or the Klehini River and therefore may not be considered subject to USACE jurisdiction.

Three man-made ponds in the study area represented by Sites 81, 83, and 172 (0.7 acre) have been created for gravel extraction. These ponds (classified as PUBHx) have been excavated out of uplands and are surrounded by uplands with no surface water connection to other waterbodies. It is likely that USACE would not assert jurisdiction over these excavated areas.

7.0 References Cited

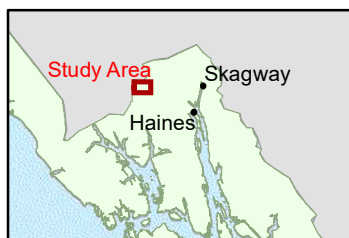
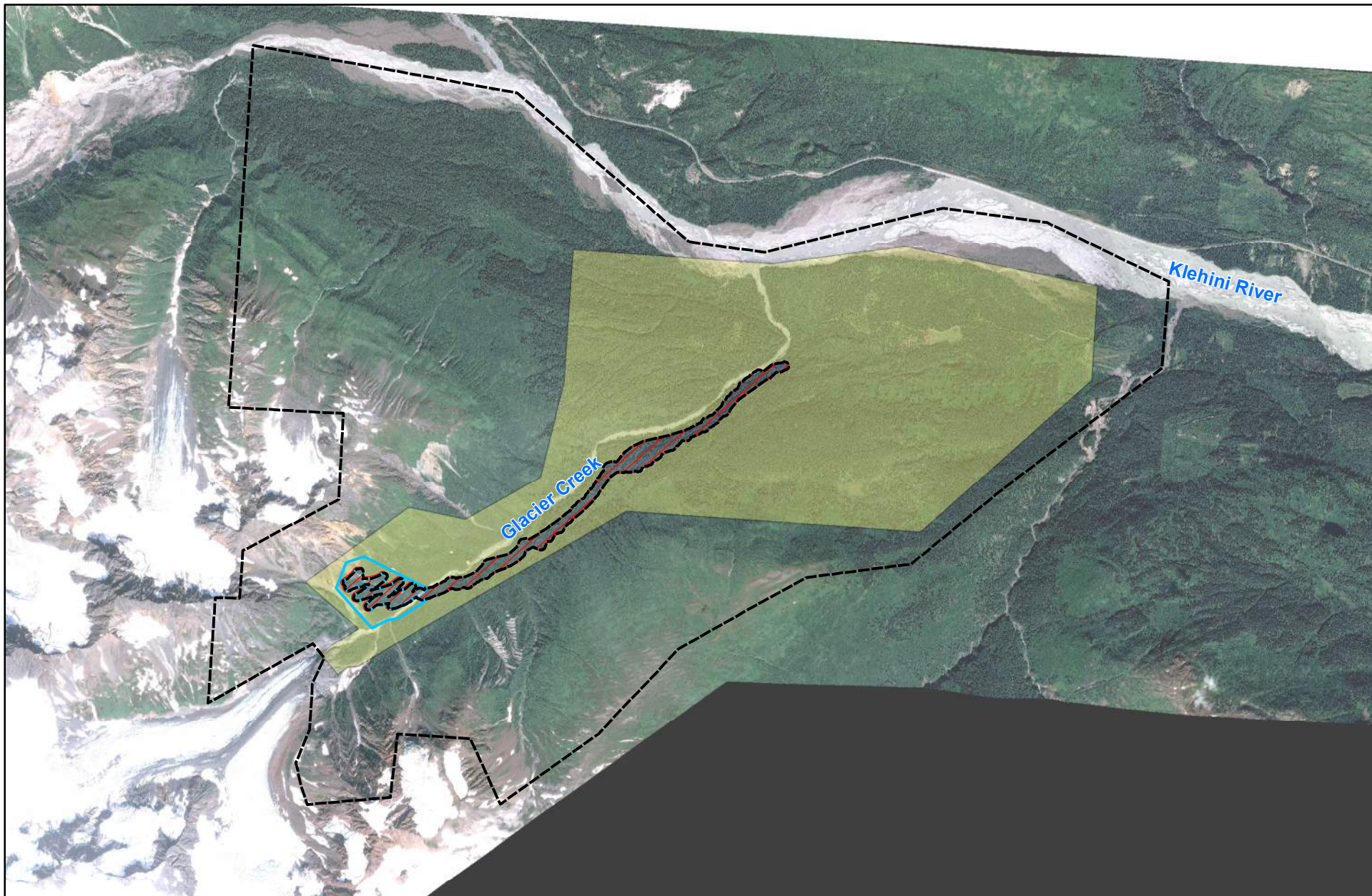
- Constantine North, Inc. (Constantine). 2013. Ortho-rectified aerial photography and LiDAR-derived topographic contours collected in July 2013.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, U.S. Fish and Wildlife Service, FWS/OBS-79-31. Washington, DC.
- Gallant, A.L., E.F. Binnian, J.M. Omernik, and M.B. Shasby. 1995. Ecoregions of Alaska. U.S. Geological Survey Professional Paper 1567.
- HDR, Inc. 2013. Wetland and Waterbody Jurisdictional Determination Report, Palmer VMS Project. Haines, AK.
- . 2015. *Expanded Wetland Mapping for the Palmer VMS Project* [Memorandum]. January 22, 2015.
- . 2017. *Expanded Area – Preliminary Wetland Mapping for the Palmer VMS Project* [Memorandum]. April 27, 2017.
- Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 wetland ratings*. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 215 733X
- Natural Resources Conservation Service (NRCS). 1997. "Hydrology tools for wetland determination": *Engineering Field Handbook*, Chapter 19. Washington D.C.
- . 2004. Land Resource Regions and Major Land Resource Areas of Alaska. U.S. Department of Agriculture.
- . 2005. Soil Survey of Haines Area, Alaska. U.S. Department of Agriculture.
- . 2017. WETS tables for Haines. Accessed at: https://efotg.sc.egov.usda.gov/efotg_locator.aspx on October 28, 2017. U.S. Department of Agriculture, National Water and Climate Center.
- U.S. Army Corps of Engineers (USACE) Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Vicksburg, MS.







- . 2007. *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Alaska Region*. Engineer Research and Development Center. ERDC/EL TR-07-24. Vicksburg, MS.
- . 2010. *Special Public Notice (SPN) 2010-45: Corps of Engineers Regulatory Program, Consultant-Supplied Jurisdictional Determination Reports*. Alaska District, Anchorage, AK.
- . 2016. Update to the National Wetland Plant List. Available online at: <http://rsgisias.crrel.usace.army.mil/NWPL/>.
- U.S. Environmental Protection Agency (USEPA) and U.S. Army Corps of Engineers (USACE). 2008. Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States.
- U.S. *Federal Register*. November 13, 1986. Part II. Rules and Regulations, Vol. 51, No. 219. U.S. Department of Defense. Corps of Engineers, Department of the Army. 33 CFR Parts 320-330, Regulatory Programs of the Corps of Engineers; Final Rule.
- . June 29, 2015. Part II. Rules and Regulations, Vol. 80, No. 124. U.S. Department of Defense. Corps of Engineers, Department of the Army. 33 CFR Parts 328, Regulatory Programs of the Corps of Engineers; Final Rule.
- U.S. Fish and Wildlife Service (USFWS). 2016. National Wetland Inventory Mapping. Available online at: <https://www.fws.gov/wetlands/data/mapper.html>.

Figures

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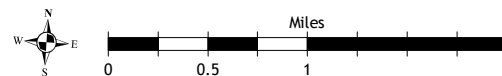


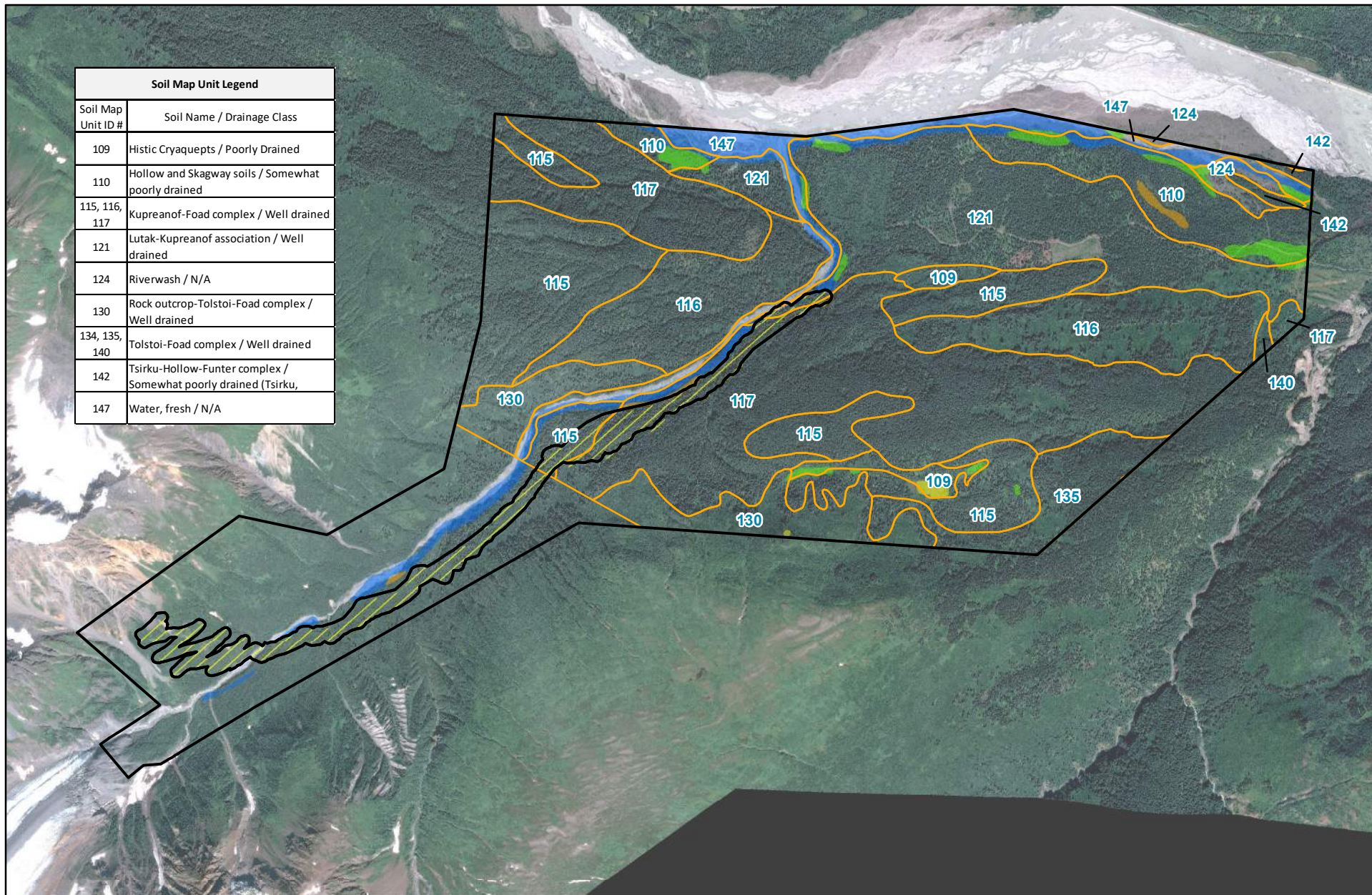
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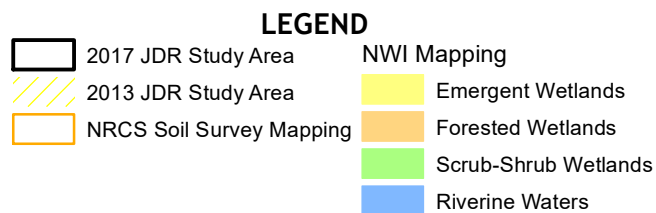
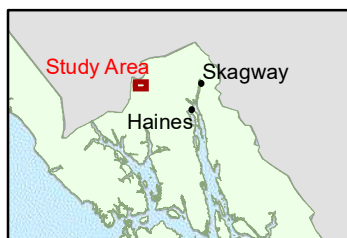
2017 Jurisdictional Determination Report Study Area Overview / Previous Mapping Areas Figure 1 of 11

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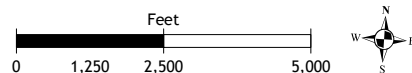




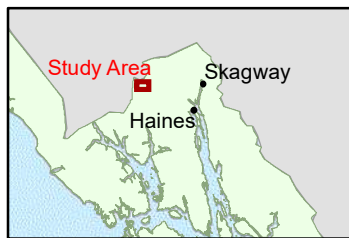
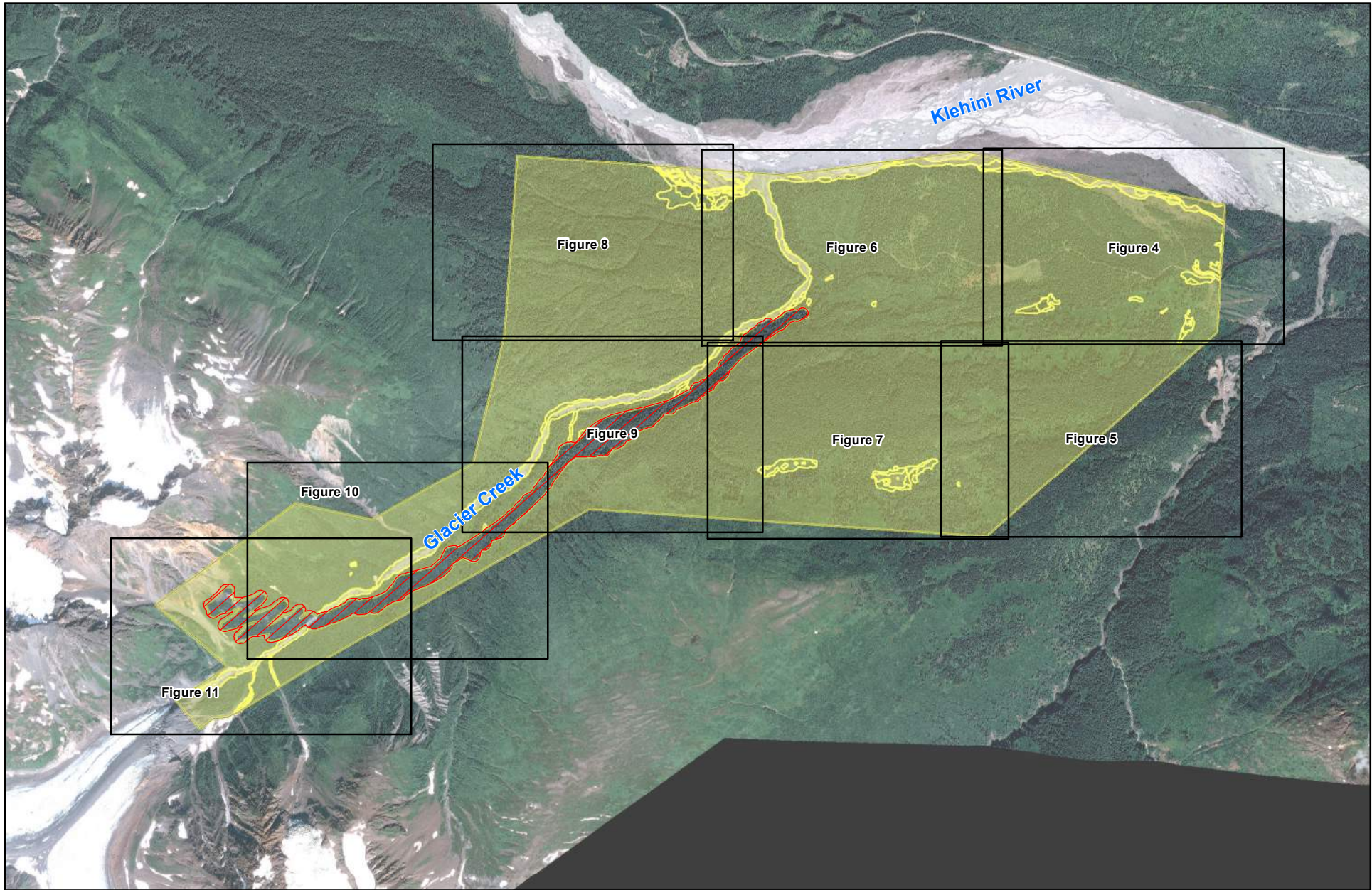
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110	Hollow and Skagway soils / Somewhat poorly drained
115, 116, 117	Kupreanof-Foad complex / Well drained
121	Lutak-Kupreanof association / Well drained
124	Riverwash / N/A
130	Rock outcrop-Tolstoi-Foad complex / Well drained
134, 135, 140	Tolstoi-Foad complex / Well drained
142	Tsirku-Hollow-Funter complex / Somewhat poorly drained (Tsirku,
147	Water, fresh / N/A



2017 Jurisdictional Determination Report National Wetlands Inventory and Soil Survey Mapping Figure 2 of 11

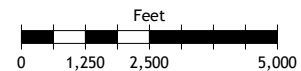


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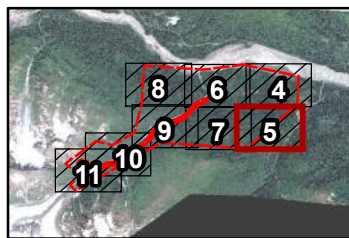
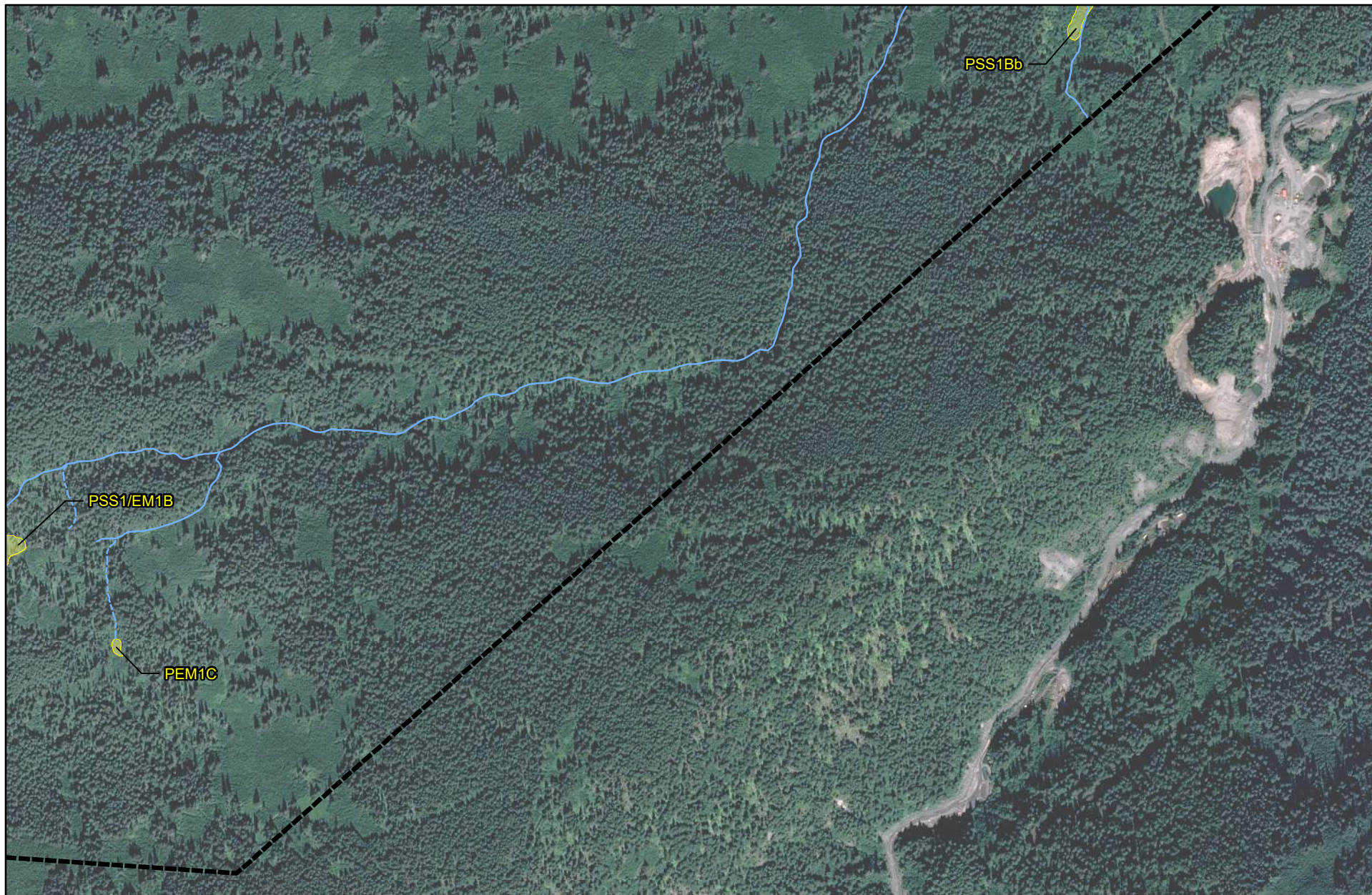
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- 2017 JDR Study Area













2017 Jurisdictional Determination Report Wetland and Waterbody Figure Index Figure 3 of 11

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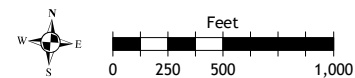


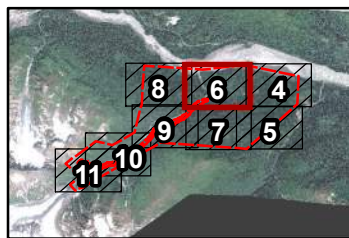
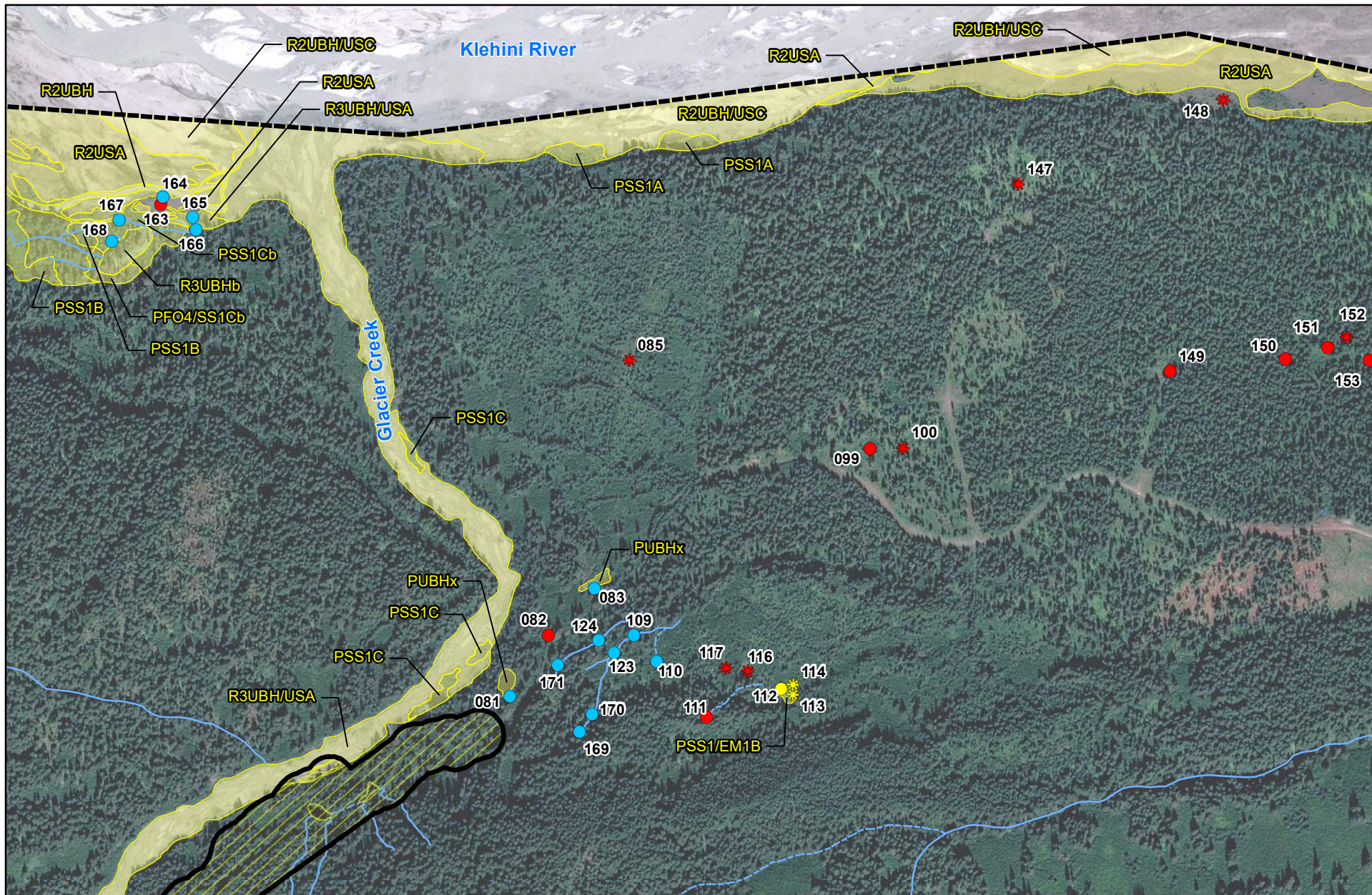
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|  | 2017 JDR Study Area |  | Data Form - Wetland |
|  | R3UBH - Upper Perennial Stream |  | Observation Point - Upland |
|  | R4SBC - Intermittent Stream |  | Observation Point - Wetland |
|  | Wetlands and Waterbodies |  | Observation Point - Waterbody |

2017 Jurisdictional Determination Report Wetland and Waterbody Mapping Figure 5 of 11

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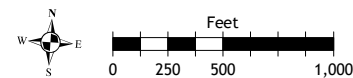


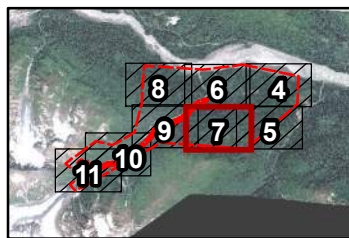
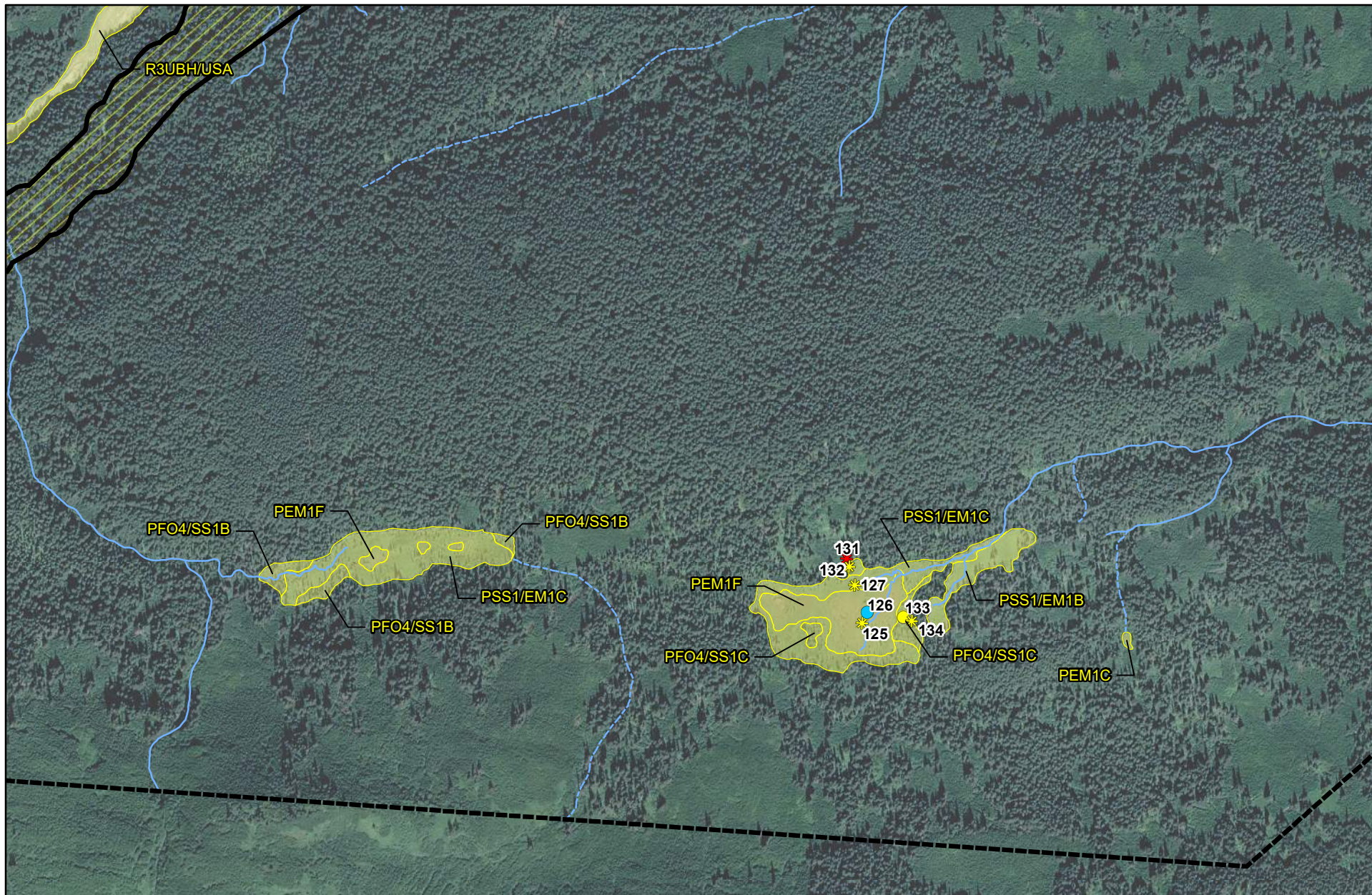
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
2017 Jurisdictional Determination Report Wetland and Waterbody Mapping Figure 6 of 11

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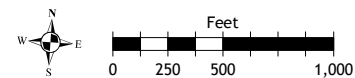




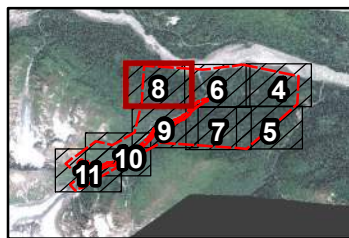
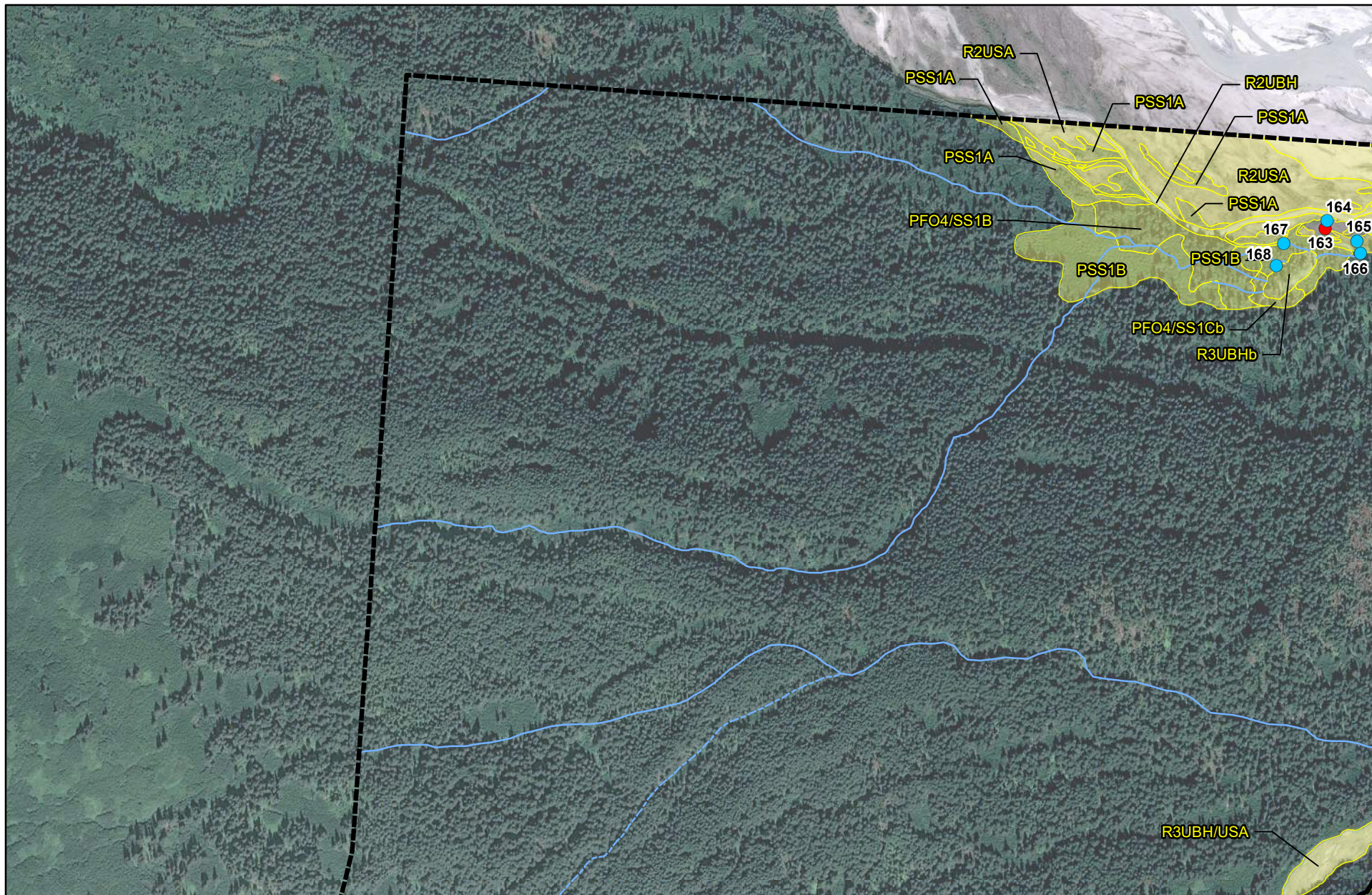
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2017 Jurisdictional Determination Report Wetland and Waterbody Mapping Figure 7 of 11



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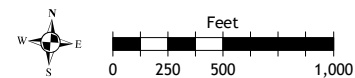


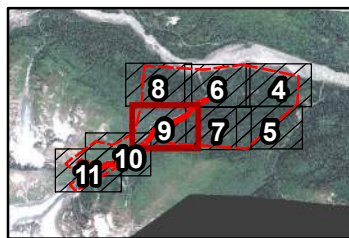
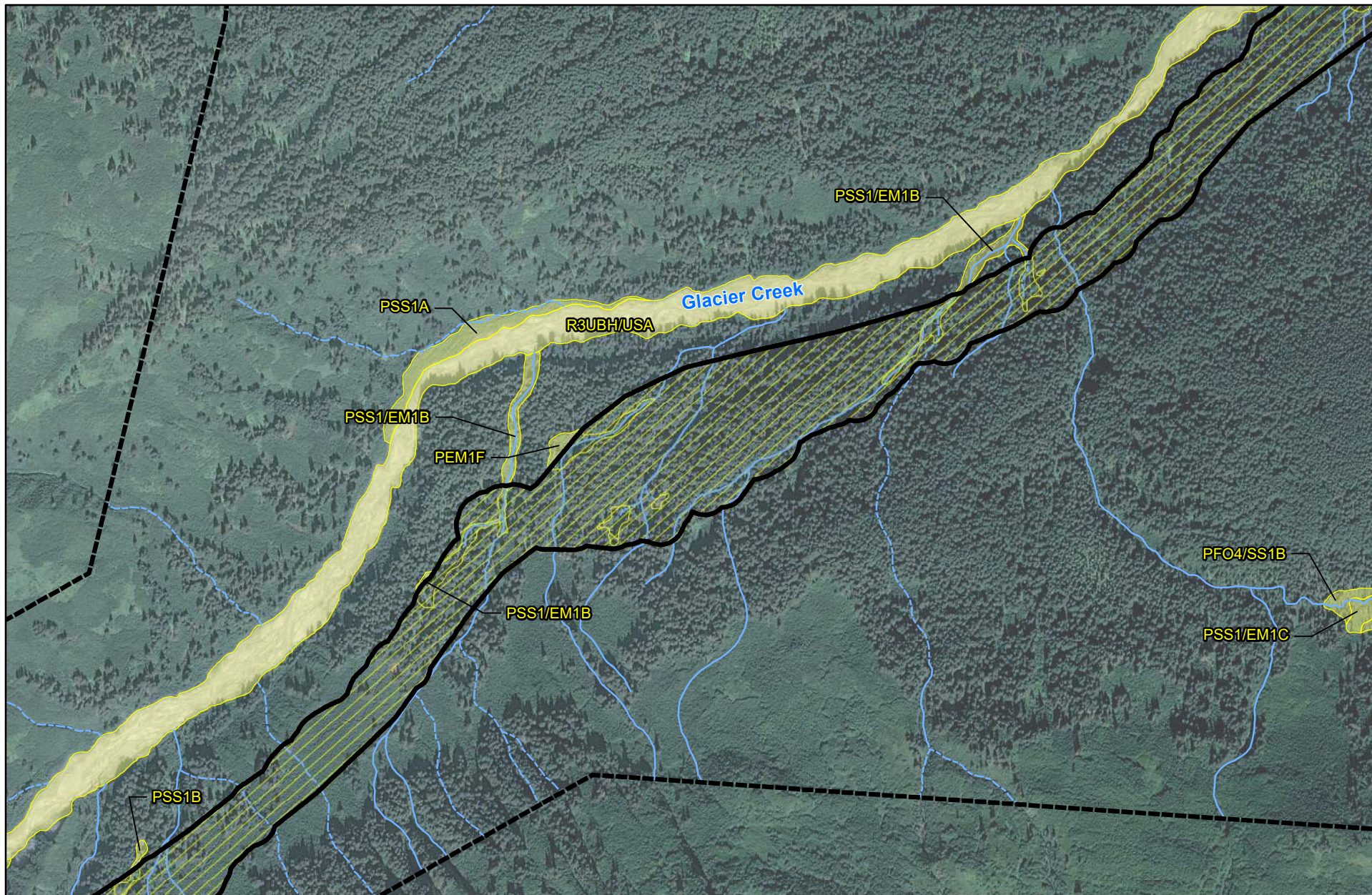
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2017 Jurisdictional Determination Report Wetland and Waterbody Mapping Figure 8 of 11

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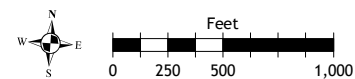


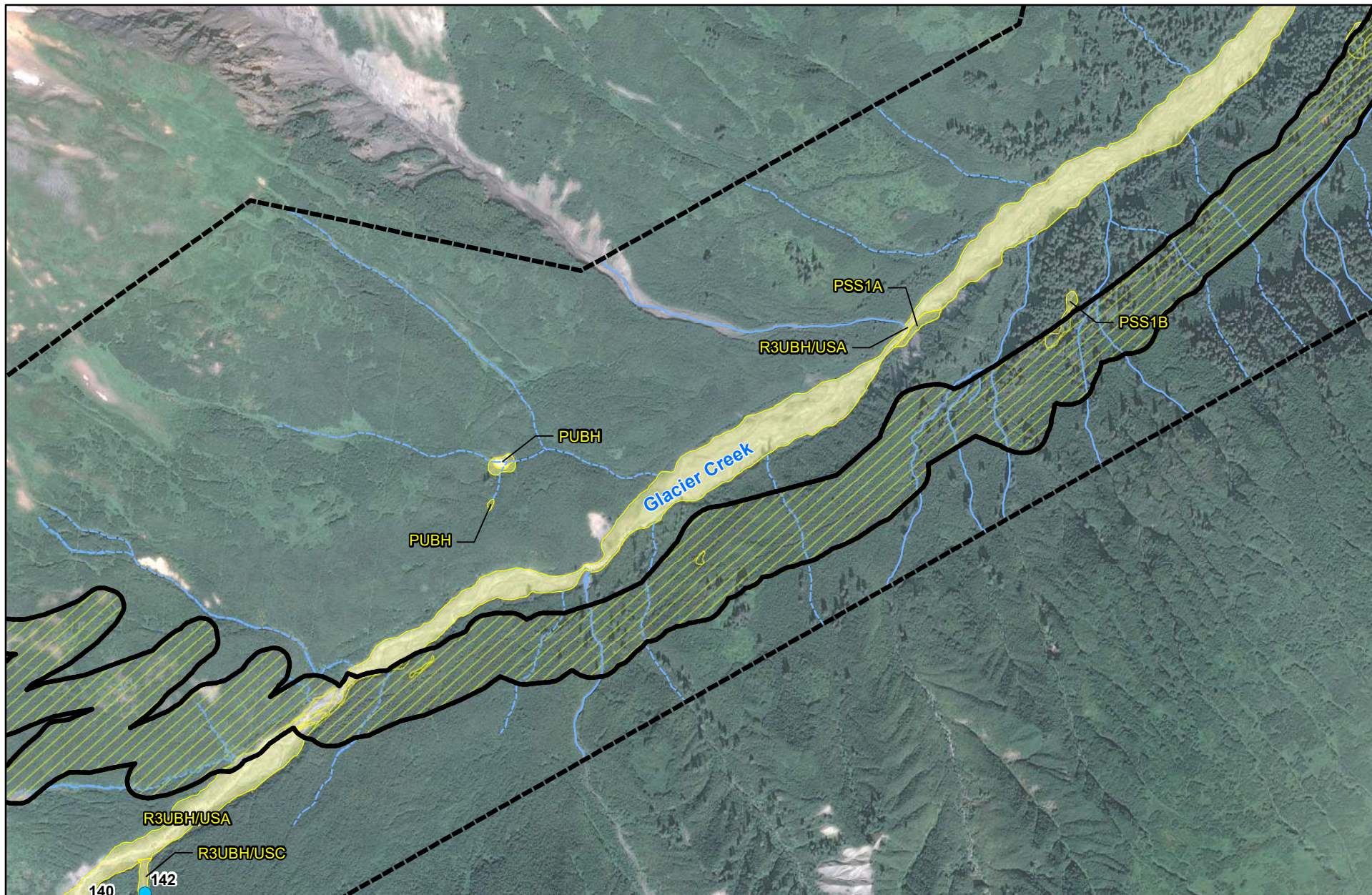
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
2017 Jurisdictional Determination Report Wetland and Waterbody Mapping Figure 9 of 11

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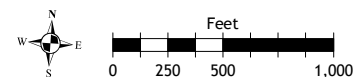


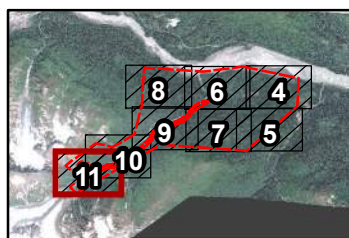
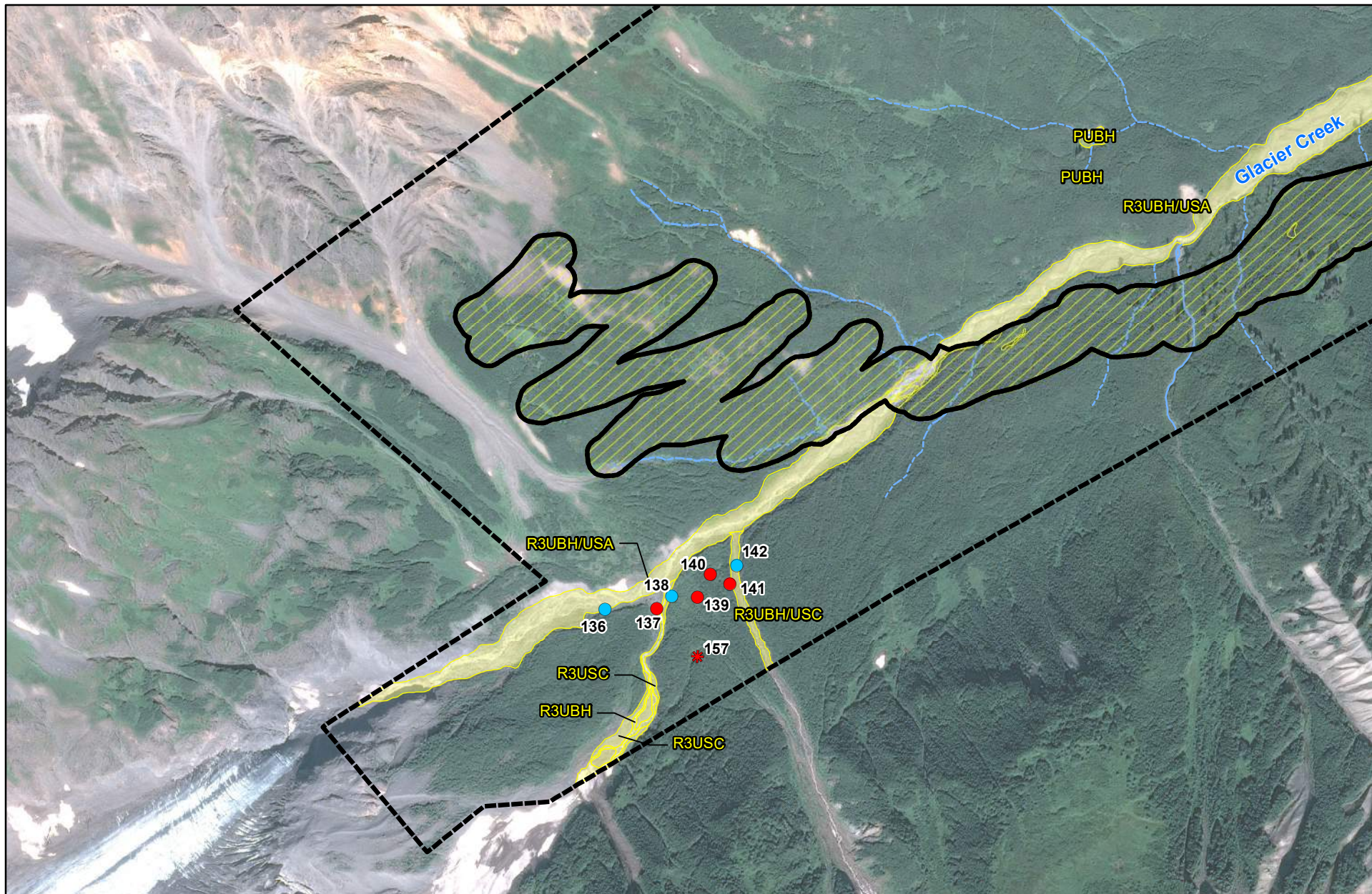
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2017 Jurisdictional Determination Report Wetland and Waterbody Mapping Figure 10 of 11

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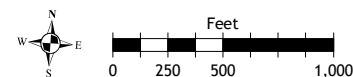


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|  | R4SBC - Intermittent Stream |  | Observation Point - Wetland |
|  | Wetlands and Waterbodies |  | Observation Point - Waterbody |

2017 Jurisdictional Determination Report Wetland and Waterbody Mapping Figure 11 of 11

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Appendix A

Wetland Determination Data Forms and Photographs

July 19-22, 2017

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WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: JNU Haines Date: 7.19.2017
 Applicant/Owner: Constantine Sampling Point #: 085
 Investigator(s): Long Jewell, Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.42424 Long. 136.29431 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☒ Field Map #:
 Subregion (circle one) SE Southcentral Western Aleutian Interior Northern Landform: Slope (%): 1 Aspect: N
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: UPLAND
 Photo nos./descriptions: 300-301 soil - 302-305 veg 297-299 extra 306-308 veg Camera #: MDS Veg Type (Viereck Level 4 or other): Open Spruce F
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	Is the sampled area within a wetland? Yes <u> </u> No <input checked="" type="checkbox"/> Remarks (e.g., marginal?): <u> </u>
Hydric Soil Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status:

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u>Picea sitch</u>	<u>15</u>	<u>Y</u>	<u>FACU</u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>2</u>	(A)
2. <u>Tsuga hct</u>	<u>1</u>	<u> </u>	<u>FAC</u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>7</u>	(B)
3. <u>Pop tri</u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>29</u>	(A/B)
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Total Tree Cover: <u>15</u>								Percent of Dominant Species That are OBL, FACW, or FAC: <u>29</u> (A/B)	
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>								Prevalence Index worksheet:	
Sapling/Shrub Stratum (woody plants < 3" dbh)								Total % Cover of: Multiply by:	
Abs. Cov. %	Dom?	Ind.	Abs. Cov. %	Dom?	Ind.				
1. <u>Alnus sin</u>	<u>Y</u>	<u>FAC</u>	7. <u>Vib edule</u>	<u>1</u>	<u>FACU</u>	OBL species	<u> </u>	X1=	<u> </u>
2. <u>Rubus spec</u>	<u>Y</u>	<u>FACU</u>	8. <u>Vaccinu aka</u>	<u>2</u>	<u>FAC</u>	FACW species	<u> </u>	X2=	<u> </u>
3. <u>Sambuca Rac</u>	<u> </u>	<u>FACU</u>	9. <u>Tri filifera</u>	<u> </u>	<u> </u>	FAC species	<u>16</u>	X3=	<u>48</u>
4. <u>Sorbus st</u>	<u>2</u>	<u>FACU</u>	10. <u>Ribes sp.</u>	<u>1</u>	<u> </u>	FACU species	<u>24</u>	X4=	<u>294</u>
5. <u>Salix bar</u>	<u>Y</u>	<u>FAC</u>	11. <u>Pop tri</u>	<u>3</u>	<u>Y</u>	UPL + NL species	<u>84</u>	X5=	<u>420</u>
6. <u>Ros aci</u>	<u>1</u>	<u>FACU</u>	12. <u>Tsuga hct</u>	<u>2</u>	<u>FAC</u>	Column Totals:	<u>174</u> (A)		<u>767</u> (B)
<u>Picea sit 2</u>	<u> </u>	<u>FAC</u>	<u>corkus can</u>	<u>2</u>	<u>FACU</u>	Prevalence Index = B/A = <u>4.4</u>			
Total Sapling/Shrub Cover: <u>30</u>									
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>									
Herb Stratum								Hydrophytic Vegetation Indicators:	
Abs. Cov. %	Dom?	Ind.	Abs. Cov. %	Dom?	Ind.				
1. <u>Epi ang (can)</u>	<u>Y</u>	<u>FACU</u>	12. <u> </u>	<u> </u>	<u> </u>	<u>N</u> Dominance Test is >50%			
2. <u>Corvus can</u>	<u> </u>	<u> </u>	13. <u> </u>	<u> </u>	<u> </u>	<u>N</u> Prevalence Index is ≤3.0			
3. <u>Gibbous trifl</u>	<u>1</u>	<u>FAC</u>	14. <u> </u>	<u> </u>	<u> </u>	<u>N</u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)			
4. <u>Tara off</u>	<u>1</u>	<u>FACU</u>	15. <u> </u>	<u> </u>	<u> </u>	<u>N</u> Problematic Hydrophytic Vegetation ¹ (Explain)			
5. <u>Thalictrum spar</u>	<u>1</u>	<u>FACU</u>	16. <u> </u>	<u> </u>	<u> </u>	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
6. <u>Hieracium alb</u>	<u>4</u>	<u>NL</u>	17. <u> </u>	<u> </u>	<u> </u>				
7. <u>Ante lan</u>	<u>1</u>	<u> </u>	18. <u> </u>	<u> </u>	<u> </u>				
8. <u>Ely gla</u>	<u>3</u>	<u>FACU</u>	19. <u> </u>	<u> </u>	<u> </u>				
9. <u>Tri repens (like)</u>	<u>2</u>	<u>FACU</u>	20. <u> </u>	<u> </u>	<u> </u>				
10. <u>Brom sitell</u>	<u>80</u>	<u>Y</u>	21. <u> </u>	<u> </u>	<u> </u>				
11. <u> </u>	<u> </u>	<u> </u>	22. <u> </u>	<u> </u>	<u> </u>				
Total Herb Cover: <u>129</u>								Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>	
50% of total cover: <u>64.5</u> 20% of total cover: <u>25.8</u>									
Circular 1/10-ac plot <u> </u> or other plot dimension: <u> </u> % of bare ground: <u> </u>									
% Cover of Wetland Bryophytes <u> </u> % Total Cover of Bryophytes <u> </u> % (where applicable)									
Remarks: <u>2.5 not in flower so not 100% on species</u> <u>10. fine leaved</u>									



Site 085: Soil, July 19, 2017



Site 085: Soil, July 19, 2017



Site 085: Vegetation, looking north on July 19, 2017



Site 085: Vegetation, looking south on July 19, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VM6 Borough/City: JNU Haines Date: 7.19.2017
 Applicant/Owner: Constance Sampling Point #: 100
 Investigator(s): Don Jowell, Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.42311 Long. 136.25477 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☒ Field Map #:
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Flat Slope (%): 1 Aspect: N
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: upland
 Photo nos./descriptions: 313-14 Soil; 315-316 veg Camera #: MOS Veg Type (Viereck Level 4 or other): Open Herbaceous
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: ☐ If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here. previously cleared area; logged.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Is the sampled area within a wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>		

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u>Tsuga hct</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>2</u>	(A)
2. <u>Picea sitch</u>	<u>0</u>	<u> </u>	<u>FACU</u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total Number of Dominant Species Across All Strata:	<u>6</u> (B)
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>33%</u> (A/B)
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet:	
Total Tree Cover: <u>15</u>								Total % Cover of:	
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>								Multiply by:	
Sapling/Shrub Stratum (woody plants < 3" dbh)								OBL species <u> </u> X1= <u> </u>	
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	FACW species <u>2</u> X2= <u>4</u>	
1. <u>Buga hct</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	7. <u>Vacc oval</u>	<u>0</u>	<u> </u>	<u>FAC</u>	FAC species <u>90</u> X3= <u>270</u>	
2. <u>Picea sitch</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	8. <u>Pop tri</u>	<u>3</u>	<u> </u>	<u>FACU</u>	FACU species <u>96</u> X4= <u>384</u>	
3. <u>Oplopan hemi</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	9. <u>Vacc alabok</u>	<u>7</u>	<u> </u>	<u>FAC</u>	UPL + NL species <u>3</u> X5= <u>15</u>	
4. <u>Alnus sin</u>	<u>5</u>	<u> </u>	<u>FAC</u>	10. <u>Vib edule</u>	<u>5</u>	<u> </u>	<u>FACU</u>	Column Totals: <u>191</u> (A) <u>673</u> (B)	
5. <u>Ribes lac</u>	<u>2</u>	<u> </u>	<u>FAC</u>	11. <u>Ribes</u>	<u>2</u>	<u> </u>	<u> </u>	Prevalence Index = B/A = <u>3.52</u>	
6. <u>Cornus can</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	12. <u>Musc per</u>	<u>2</u>	<u> </u>	<u>FACU</u>		
<u>Rubus spec</u>	<u>2</u>	<u> </u>	<u>FACU</u>	<u>Cornus sto</u>	<u>1</u>	<u> </u>	<u>FAC</u>		
<u>Rosa sp</u>	<u>1</u>	<u> </u>	<u>FACU</u>	<u>Salix hct</u>	<u>2</u>	<u> </u>	<u>FAC</u>		
Total Sapling/Shrub Cover: <u>110</u>									
50% of total cover: <u>55</u> 20% of total cover: <u>22</u>									
Herb Stratum								Hydrophytic Vegetation Indicators:	
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	N Dominance Test is >50%	
1. <u>Gymn dy</u>	<u>35</u>	<u>Y</u>	<u>FACU</u>	12. <u>Carex meckla</u>	<u>1</u>	<u> </u>	<u>FACU</u>	N Prevalence Index is ≤3.0	
2. <u>Ely ang (am)</u>	<u>10</u>	<u> </u>	<u>FACU</u>	13. <u>Carex mertensiana</u>	<u>1</u>	<u> </u>	<u>FACU</u>	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
3. <u>Ortho sec</u>	<u>2</u>	<u> </u>	<u>FACU</u>	14. <u>Strep ras</u>	<u>1</u>	<u> </u>	<u>FACU</u>	Problematic Hydrophytic Vegetation ¹ (Explain)	
4. <u>Tiarella tri</u>	<u>5</u>	<u> </u>	<u>FAC</u>	15. <u>Cinna (at wood ridge)</u>	<u>2</u>	<u> </u>	<u>FACU</u>		
5. <u>Ely ang</u>	<u>4</u>	<u> </u>	<u>FAC</u>	16. <u>Athy fil-gram</u>	<u>2</u>	<u> </u>	<u>FAC</u>		
6. <u>Strep amp</u>	<u>3</u>	<u> </u>	<u>FACU</u>	17. <u>Pyrola picta</u>	<u>3</u>	<u> </u>	<u>NL</u>		
7. <u>Gecum macro</u>	<u>1</u>	<u> </u>	<u>FAC</u>	18. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
8. <u>Ely ang sp.</u>	<u>2</u>	<u> </u>	<u> </u>	19. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
9. <u>Hieracium alb</u>	<u>1</u>	<u> </u>	<u>NL</u>	20. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
10. <u>Gial tri</u>	<u>1</u>	<u> </u>	<u>FAC</u>	21. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
11. <u>Jura off</u>	<u>1</u>	<u> </u>	<u>FACU</u>	22. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
Total Herb Cover: <u>68</u>								Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
50% of total cover: <u>34</u> 20% of total cover: <u>13.6</u>									
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u> </u> % of bare ground: <u>5</u>									
% Cover of Wetland Bryophytes <u>0</u> % Total Cover of Bryophytes <u>65</u> %									
(where applicable)									
Remarks: <u>bare ground = littered. Wood pecker; Kinglet</u>									

SOIL

Sampling Point #: 100

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (in.)	Horizon (opt.)	Soil Matrix		Redox Features				Texture	α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type ¹	Loc ²			
0-4	O _i									
4-8	B	5Y41	40	5YR34	55 ^(sr)	C	RC+M	Sil	neg	Some buried organics (5%)
8-18+	B ₂	2.5Y2.5/1	70					Sa	neg	30% gravels

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- ☒ Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)
- ☒ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ☒ Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____" in this pit)
- ☒ Thick Dark Surface (A12)
- ☒ Alaska Gleyed (A13)
- ☒ Alaska Redox (A14)
- ☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change⁴ (TA4)
- ☒ Alaska Alpine Swales (TA5)
- ☒ Alaska Redox with 2.5Y Hue
- ☒ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ☒ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present)

Type: NONE

Depth (inches) _____

Drainage Class: Well Drained

Soil Map Unit Name: _____

Hydric Soil Present?

Yes _____

No ☒

Comments:

1. 4-6"; buried org 5%
- 2.
- 3.

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2) (w/in 12")
- ☒ Saturation (A3) (w/in 12")
- ☒ Water Marks (B1)
- ☒ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☒ Iron Deposits (B5)
- ☒ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☒ Marl Deposits (B15)
- ☒ Hydrogen Sulfide Odor (C1) (w/in 12")
- ☒ Dry-Season Water Table (C2) (w/in 24")
- ☒ Other (explain) _____

Secondary Indicators (at least 2 are required)

- ☒ Water-Stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ☒ Presence of Reduced Iron (C4) (pos. α, α or soil color change w/in 12")
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3) (w/in 24", can perch H₂O w/in 12")
- ☒ Microtopographic Relief (D4) (caused by water)
- ☒ FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

- Surface Water Present? Yes _____ No ☒ Depth of water (in.) _____
- Water Table Present? Yes _____ No ☒ Depth to water (in.) _____
- Seeping in at that depth but not yet filled?: _____
- Saturation Present? Yes _____ No ☒ Depth to sat. (in.) _____
- (Includes capillary fringe) Epi Endo Unknown

Wetland Hydrology Present?

Yes _____

No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 100: Soil, July 19, 2017



Site 100: Soil, July 19, 2017



Site 100: Vegetation, looking north on July 19, 2017



Site 100: Vegetation, looking east on July 19, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palma VMS Borough/City: TNU Haines Date: 7/19/2017
 Applicant/Owner: Constantine Sampling Point #: 113
 Investigator(s): Doug Powell - Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.) 59.41869 Long. 136.28781 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☒ Field Map #:
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Slope/low Slope (%): Aspect: N
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: RGS1/10m
 Photo nos./descriptions: 343/44=SOIL; 345-348 NESW Camera #: Veg Type (Viereck Level 4 or other): Open Alder
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: If no, explain. HGM type: Slope
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <u> </u>	Is the sampled area within a wetland? Yes <input checked="" type="checkbox"/> No <u> </u> Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <u> </u>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <u> </u>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u>Populus</u>				5. <u> </u>				2	(A)
2. <u> </u>				6. <u> </u>					
3. <u> </u>				7. <u> </u>				3	(B)
4. <u> </u>				8. <u> </u>					
Total Tree Cover: <u>0</u>								Percent of Dominant Species That are OBL, FACW, or FAC:	66.7% (A/B)
50% of total cover: <u> </u>								20% of total cover: <u> </u>	
Sapling/Shrub Stratum (woody plants < 3" dbh)								Prevalence Index worksheet:	
Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Total % Cover of:	Multiply by:
1. <u>Alnus sin</u>	10	Y	FAC	7. <u> </u>				OBL species	8
2. <u>Oplopanax</u>	15	Y	FACW	8. <u> </u>				FACW species	-
3. <u> </u>				9. <u> </u>				FAC species	05
4. <u> </u>				10. <u> </u>				FACU species	35
5. <u> </u>				11. <u> </u>				UPL + NL species	-
6. <u> </u>				12. <u> </u>				Column Totals:	128 (A) 403 (B)
Total Sapling/Shrub Cover: <u>25</u>								Prevalence Index = B/A = <u>3.15</u>	
50% of total cover: <u>12.5</u>								20% of total cover: <u>5</u>	
Herb Stratum								Hydrophytic Vegetation Indicators:	
Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Y	Dominance Test is >50%
1. <u>Artemisia</u>	60	Y	FAC	12. <u> </u>				N <th>Prevalence Index is ≤3.0</th>	Prevalence Index is ≤3.0
2. <u>Urt. dio.</u>	15		FACW	13. <u> </u>					
3. <u>Stroph. amp</u>	5		FACW	14. <u> </u>					
4. <u>Equis. ar.</u>	15		FAC	15. <u> </u>					
5. <u>Equis. flav.</u>	8		OBL	16. <u> </u>					
6. <u> </u>				17. <u> </u>					
7. <u> </u>				18. <u> </u>					
8. <u> </u>				19. <u> </u>					
9. <u> </u>				20. <u> </u>					
10. <u> </u>				21. <u> </u>					
11. <u> </u>				22. <u> </u>					
Total Herb Cover: <u>103</u>								Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <u> </u>	
50% of total cover: <u>51.5</u>								20% of total cover: <u>20.6</u>	
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u> </u> % of bare ground: <u>10</u>									
% Cover of Wetland Bryophytes <u>40</u> % Total Cover of Bryophytes <u>75</u> %									
Remarks:									



Site 113: Soil, July 19, 2017



Site 113: Soil, July 19, 2017



Site 113: Vegetation, looking east on July 19, 2017



Site 113: Vegetation, looking south on July 19, 2017



Site 114: Soil, July 19, 2017



Site 114: Soil, July 19, 2017



Site 114: Vegetation, looking north on July 19, 2017



Site 114: Vegetation, looking east on July 19, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Haines Date: 7/14/17
 Applicant/Owner: Crescent Sampling Point #: 116
 Investigator(s): Jewell, Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.41903 Long. 136.28941 ± ' NAD 83 Recorded on GPS #: 7 Marked on map? 7 Field Map #:
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: deltaic Slope (%): Aspect:
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: Upland
 Photo nos./descriptions: 355-56 (soil) 357-60 (N-SW) Camera #: Veg Type (Viereck Level 4 or other): Cal Care meadow
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u>X</u>	No <u> </u>	Is the sampled area within a wetland? Yes <u> </u> No <u>X</u> Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <u> </u>	No <u>X</u>	
Wetland Hydrology Present?	Yes <u> </u>	No <u>X</u>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u> </u>				5. <u> </u>				<u>1</u>	(A)
2. <u> </u>				6. <u> </u>					
3. <u> </u>				7. <u> </u>					
4. <u> </u>				8. <u> </u>					
Total Tree Cover: <u> </u>								Total Number of Dominant Species Across All Strata:	<u>1</u> (B)
50% of total cover: <u> </u> 20% of total cover: <u> </u>								Percent of Dominant Species That are OBL, FACW, or FAC:	<u>100</u> (A/B)
Sapling/Shrub Stratum (woody plants < 3" dbh)								Prevalence Index worksheet:	
Abs. Cov. %	Dom?	Ind.	Abs. Cov. %	Dom?	Ind.	Total % Cover of:		Multiply by:	
1. <u> </u>			7. <u> </u>			OBL species	<u> </u>	X1=	<u> </u>
2. <u> </u>			8. <u> </u>			FACW species	<u> </u>	X2=	<u> </u>
3. <u> </u>			9. <u> </u>			FAC species	<u>65</u>	X3=	<u>195</u>
4. <u> </u>			10. <u> </u>			FACU species	<u> </u>	X4=	<u> </u>
5. <u> </u>			11. <u> </u>			UPL + NL species	<u> </u>	X5=	<u> </u>
6. <u> </u>			12. <u> </u>			Column Totals:	<u>65</u> (A)		<u>195</u> (B)
Total Sapling/Shrub Cover: <u> </u>								Prevalence Index = B/A =	<u>3</u>
50% of total cover: <u> </u> 20% of total cover: <u> </u>									
Herb Stratum								Hydrophytic Vegetation Indicators:	
Abs. Cov. %	Dom?	Ind.	Abs. Cov. %	Dom?	Ind.	<u>Y</u> Dominance Test is >50%			
1. <u>Cal care</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	12. <u> </u>		<u>Y</u> Prevalence Index is ≤3.0			
2. <u>Tri care</u>	<u>5</u>		<u> </u>	13. <u> </u>		<u>N</u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)			
3. <u>Alb Cal</u>	<u>5</u>		<u>FAC</u>	14. <u> </u>		<u>N</u> Problematic Hydrophytic Vegetation ¹ (Explain)			
4. <u> </u>			<u> </u>	15. <u> </u>		¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
5. <u> </u>			<u> </u>	16. <u> </u>					
6. <u> </u>			<u> </u>	17. <u> </u>					
7. <u> </u>			<u> </u>	18. <u> </u>					
8. <u> </u>			<u> </u>	19. <u> </u>					
9. <u> </u>			<u> </u>	20. <u> </u>					
10. <u> </u>			<u> </u>	21. <u> </u>					
11. <u> </u>			<u> </u>	22. <u> </u>					
Total Herb Cover: <u>60</u>								Hydrophytic Vegetation Present?	
50% of total cover: <u>30</u> 20% of total cover: <u>12</u>								Yes <u>X</u> No <u> </u>	
Circular 1/10-ac plot <u> </u> or other plot dimension: <u> </u> % of bare ground: <u> </u>									
% Cover of Wetland Bryophytes <u> </u> % Total Cover of Bryophytes <u> </u> %									
(where applicable)									
Remarks:									

SOIL

Sampling Point #: 116

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (in.)	Horizon (opt.)	Soil Matrix		Redox Features				Texture	α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type ¹	Loc ²			
0-2	O ₁									
2-5	B ₁	10 YR 3/1						cl		
5-19	B ₂	5 Y 3/2						cl		~20% gravel

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- ☒ Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)
- ☒ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ☒ Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____" in this pit)
- ☒ Thick Dark Surface (A12)
- ☒ Alaska Gleyed (A13)
- ☒ Alaska Redox (A14)
- ☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change⁴ (TA4)
- ☒ Alaska Alpine Swales (TA5)
- ☒ Alaska Redox with 2.5Y Hue
- ☒ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ☒ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present)

 Type: _____
 Depth (inches) _____
Drainage Class: ND

Soil Map Unit Name: _____

Hydric Soil Present? Yes _____ No X

Comments:

-
-
-

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2) (w/in 12")
- ☒ Saturation (A3) (w/in 12")
- ☒ Water Marks (B1)
- ☒ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☒ Iron Deposits (B5)
- ☒ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☒ Marl Deposits (B15)
- ☒ Hydrogen Sulfide Odor (C1) (w/in 12")
- ☒ Dry-Season Water Table (C2) (w/in 24")
- ☒ Other (explain)

Secondary Indicators (at least 2 are required)

- ☒ Water-Stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ☒ Presence of Reduced Iron (C4) (pos. α, α or soil color change w/in 12")
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3) (w/in 24", can perch H₂O w/in 12")
- ☒ Microtopographic Relief (D4) (caused by water)
- ☒ FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes _____ No X Depth of water (in.) _____

Water Table Present? Yes _____ No X Depth to water (in.) _____

Seeping in at that depth but not yet filled?: _____

Saturation Present? Yes _____ No X Depth to sat. (in.) _____

(includes capillary fringe) Epi Endo Unknown

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 116: Soil, July 19, 2017



Site 116: Soil, July 19, 2017



Site 116: Vegetation, looking east on July 19, 2017



Site 116: Vegetation, looking south on July 19, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: TNU/Haines Date: 7.19
 Applicant/Owner: Constantine Sampling Point #: 117
 Investigator(s): Donna Jovell; Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.) 59.41905 Long. 136.29016 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☐ Field Map #:
 Subregion (circle one): ☒ SE Southcentral Western Aleutian Interior Northern Landform: Depression Slope (%): Aspect:
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: U
 Photo nos./descriptions: 361/62 - 301L 363 - 366 NESW Camera #: M5 Veg Type (Viereck Level 4 or other): 11A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: ☐ If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the sampled area within a wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input checked="" type="checkbox"/>		

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:			
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:			
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>3</u>	(A)		
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total Number of Dominant Species Across All Strata:	<u>4</u> (B)		
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>75%</u> (A/B)		
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet:			
Total Tree Cover: <u>0</u>								Total % Cover of:			
50% of total cover: <u> </u> 20% of total cover: <u> </u>								Multiply by:			
Sapling/Shrub Stratum (woody plants < 3" dbh)								OBL species <u>3</u> X1= <u>3</u>			
Abs. Cov. % Dom? Ind.								FACW species <u>0 (T)</u> X2= <u>0 (T)</u>			
1. <u>Salix bar</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	FAC species <u>110</u>	X3= <u>330</u>		
2. <u>Vib edn</u>	<u>8</u>	<u>Y</u>	<u>FACU</u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	FACU species <u>8</u>	X4= <u>32</u>		
3. <u>Cornus stol</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	UPL + NL species <u>0</u>	X5= <u>0</u>		
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Column Totals: <u>118</u> (A)	<u>362</u> (B)		
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index = B/A = <u>3.07</u>			
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	12. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
Total Sapling/Shrub Cover: <u>33</u>											
50% of total cover: <u>16.5</u> 20% of total cover: <u>6.6</u>											
Herb Stratum											
Abs. Cov. % Dom? Ind.											
1. <u>Athyra fil-fer</u>	<u>75</u>	<u>Y</u>	<u>FAC</u>	12. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Hydrophytic Vegetation Indicators:			
2. <u>Cal can</u>	<u>8</u>	<u> </u>	<u>FAC</u>	13. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>Y</u> Dominance Test is >50%			
3. <u>Stell sp</u>	<u>1</u>	<u> </u>	<u> </u>	14. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>N</u> Prevalence Index is ≤3.0			
4. <u>Parn pal</u>	<u>1</u>	<u> </u>	<u>FACW</u>	15. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>Y</u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)			
5. <u>Equis flw</u>	<u>3</u>	<u> </u>	<u>OBL</u>	16. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>N</u> Problematic Hydrophytic Vegetation ¹ (Explain)			
6. <u>Equis arv</u>	<u>2</u>	<u> </u>	<u>FAC</u>	17. <u> </u>	<u> </u>	<u> </u>	<u> </u>	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	18. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	19. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	20. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	21. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	22. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
Total Herb Cover: <u>88</u>											
50% of total cover: <u>44</u> 20% of total cover: <u>17.6</u>											
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u> </u> % of bare ground: <u>10</u>											
% Cover of Wetland Bryophytes <u>0</u> % Total Cover of Bryophytes <u>10</u> %											
(where applicable)											
Remarks: <u>Wetlands; through vis.</u>											
<u>plot limited to depression (not circular, more oblong)</u>											

SOIL

Sampling Point #: 117

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (in.)	Horizon (opt.)	Soil Matrix		Redox Features				a,a dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-3	Oi								
3-6	Oa								
6-20	B	5Y2.5/1						SIL	neg
		10YR2/2							

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- ☒ Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)
- ☒ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ☒ Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____ " in this pit)
- ☒ Thick Dark Surface (A12)
- ☒ Alaska Gleyed (A13)
- ☒ Alaska Redox (A14)
- ☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change⁴ (TA4)
- ☒ Alaska Alpine Swales (TA5)
- ☒ Alaska Redox with 2.5Y Hue
- ☒ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ☒ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present)

Type: none

Depth (inches) _____

Drainage Class: MWD

Soil Map Unit Name:

Hydric Soil Present? Yes _____ No ☒

Comments:

-
-
-

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2) (w/in 12")
- ☒ Saturation (A3) (w/in 12")
- ☒ Water Marks (B1)
- ☒ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☒ Iron Deposits (B5)
- ☒ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☒ Marl Deposits (B15)
- ☒ Hydrogen Sulfide Odor (C1) (w/in 12")
- ☒ Dry-Season Water Table (C2) (w/in 24")
- ☒ Other (explain)

Secondary Indicators (at least 2 are required)

- ☒ Water-Stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ☒ Presence of Reduced Iron (C4) (pos. a,a or soil color change w/in 12")
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3) (w/in 24", can perch H₂O w/in 12")
- ☒ Microtopographic Relief (D4) (caused by water)
- ☒ FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes _____ No ☒ Depth of water (in.) _____Water Table Present? Yes _____ No ☒ Depth to water (in.) _____

Seeping in at that depth but not yet filled?: _____

Saturation Present? Yes _____ No ☒ Depth to sat. (in.) _____

(includes capillary fringe) Epi Endo Unknown

Wetland Hydrology Present? Yes ☒ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 117: Soil, July 19, 2017



Site 117: Soil, July 19, 2017



Site 117: Vegetation, looking north on July 19, 2017



Site 117: Vegetation, looking south on July 19, 2017

WETLAND DETERMINATION DATA FORM – Alaska Region

Project: Pullover VMS Borough/City: Haines Date: 7/20/17
 Applicant/Owner: Conglomerate Sampling Point #: 125
 Investigator(s): Jewell, Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.) 59.40562 Long. 136.28241 ± ' NAD 83 Recorded on GPS #: X Marked on map? X Field Map #:
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: low slope Slope (%): 2 Aspect: N
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PEM1P
 Photo nos./descriptions: 392-93 (Soil) 394-97 (NW) 398-399 Camera #: Veg Type (Viereck Level 4 or other): Wet Meadows
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: X No: If no, explain. HGM type: Slope
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u>X</u>	No <u> </u>	Is the sampled area within a wetland? Yes <u> </u> No <u> </u> Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <u>X</u>	No <u> </u>	
Wetland Hydrology Present?	Yes <u>X</u>	No <u> </u>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 Indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>6</u>	(A)
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total Number of Dominant Species Across All Strata:	<u>8</u> (B)
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>75</u> (A/B)
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet:	
Total Tree Cover: <u> </u>								Total % Cover of:	
50% of total cover: <u> </u> 20% of total cover: <u> </u>								Multiply by:	
Sapling/Shrub Stratum (woody plants < 3" dbh)								OBL species <u>80</u> X1= <u>80</u>	
Abs. Cov. %	Dom?	Ind.	Abs. Cov. %	Dom?	Ind.	FACW species <u>98</u> X2= <u>196</u>			
1. <u>Bet gla</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	7. <u>Cor can</u>	<u>3</u>	<u>FACU</u>			
2. <u>Pic sit</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>	8. <u>Vib edn</u>	<u>4</u>	<u>FACU</u>			
3. <u>Vac ova</u>	<u>2</u>	<u> </u>	<u>FAC</u>	9. <u>Emp nia</u>	<u>2</u>	<u>FAC</u>			
4. <u>Vac ali</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	10. <u>And pot</u>	<u>2</u>	<u>FACW</u>			
5. <u>Rub chan</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	11. <u>Kal mic</u>	<u>3</u>	<u>OBL</u>			
6. <u>Ton bet</u>	<u>2</u>	<u> </u>	<u>FAC</u>	12. <u>Pat frn</u>	<u>3</u>	<u>FAC</u>			
<u>Man far</u>	<u>2</u>	<u> </u>	<u>FACU</u>						
Total Sapling/Shrub Cover: <u>58</u>								Column Totals: <u>268</u> (A) <u>580</u> (B)	
50% of total cover: <u>29</u> 20% of total cover: <u>11.6</u>								Prevalence Index = B/A = <u>2.16</u>	
Herb Stratum								Hydrophytic Vegetation Indicators:	
Abs. Cov. %	Dom?	Ind.	Abs. Cov. %	Dom?	Ind.	Y Dominance Test is >50%			
1. <u>Cor bup</u>	<u>25</u>	<u>Y</u>	<u>FACW</u>	12. <u>Pla dil</u>	<u>2</u>	Y Prevalence Index is ≤3.0			
2. <u>Cor plu</u>	<u>10</u>	<u> </u>	<u>OBL</u>	13. <u>Pla str</u>	<u>3</u>	<u>FACU</u>			
3. <u>Tri coc</u>	<u>60</u>	<u>Y</u>	<u>OBL</u>	14. <u>Ger eri</u>	<u>3</u>	<u>FACU</u>			
4. <u>Par pal</u>	<u>8</u>	<u> </u>	<u>FACW</u>	15. <u>Suc per</u>	<u>5</u>	<u>FACW</u>			
5. <u>Cap pyr</u>	<u>10</u>	<u> </u>	<u>FACW</u>	16. <u>Cap tri</u>	<u>2</u>	<u>FAC</u>			
6. <u>Sp: ram</u>	<u>2</u>	<u> </u>	<u>OBL</u>	17. <u>Fagn flm</u>	<u>5</u>	<u>OBL</u>			
7. <u>Tha alp</u>	<u>8</u>	<u> </u>	<u>FAC</u>	18. <u>Eg: arv</u>	<u>7</u>	<u>FAC</u>			
8. <u>Tof glm</u>	<u>8</u>	<u> </u>	<u>FACW</u>	19. <u>Anc par</u>	<u>15</u>	<u>Y</u> <u>FACU</u>			
9. <u>San can</u>	<u>3</u>	<u> </u>	<u>FACU</u>	20. <u>Eri per</u>	<u>15</u>	<u>Y</u> <u>FACW</u>			
10. <u>Tri eur</u>	<u>2</u>	<u> </u>	<u>FACU</u>	21. <u>Ast sub</u>	<u>10</u>	<u>FAC</u>			
11. <u>Vio pal</u>	<u>7</u>	<u> </u>	<u>FACW</u>	22. <u>Dro rot</u>	<u>7</u>	<u>OBL</u>			
Total Herb Cover: <u>210</u>								Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	
50% of total cover: <u>105</u> 20% of total cover: <u>42</u>									
Circular 1/10-ac plot <u> </u> or other plot dimension: <u> </u> % of bare ground: <u> </u>									
% Cover of Wetland Bryophytes <u> </u> % Total Cover of Bryophytes <u> </u> % (where applicable)									
Remarks:									



Site 125: Soil, July 20, 2017



Site 125: Soil, July 20, 2017



Site 125: Vegetation, looking north on July 20, 2017



Site 125: Vegetation, looking south on July 20, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palma VMS Borough/City: TNU/Haines Date: 7-20-2017
 Applicant/Owner: Constantine Sampling Point #: 127
 Investigator(s): Donna Jurek, Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.40627 Long. 136.28296 ± NAD 83 Recorded on GPS #: Marked on map? Field Map #:
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Toe slope Slope (%): Aspect:
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PSS1/FAC1
 Photo nos./descriptions: 404/05 Soil; 406-409 NBSW Camera #: M05 Veg Type (Viereck Level 4 or other): Open wetland
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: No: If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u> </u>	No <u> </u>	Is the sampled area within a wetland? Yes <u> </u> No <u> </u> Remarks (e.g., marginal?): <u> </u>
Hydric Soil Present?	Yes <u> </u>	No <u> </u>	
Wetland Hydrology Present?	Yes <u> </u>	No <u> </u>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>5</u>	(A)
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total Number of Dominant Species Across All Strata:	<u>5</u> (B)
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>100%</u> (A/B)
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet:	
Total Tree Cover: <u>edge of plot</u>								Total % Cover of:	Multiply by:
50% of total cover: <u> </u> 20% of total cover: <u> </u>								OBL species	<u>30</u> X1= <u>30</u>
50% of total cover: <u> </u> 20% of total cover: <u> </u>								FACW species	<u>50</u> X2= <u>116</u>
50% of total cover: <u> </u> 20% of total cover: <u> </u>								FAC species	<u>93</u> X3= <u>279</u>
50% of total cover: <u> </u> 20% of total cover: <u> </u>								FACU species	<u>7</u> X4= <u>28</u>
50% of total cover: <u> </u> 20% of total cover: <u> </u>								UPL + NL species	<u>0</u> X5= <u>0</u>
50% of total cover: <u> </u> 20% of total cover: <u> </u>								Column Totals:	<u>188</u> (A) <u>453</u> (B)
50% of total cover: <u> </u> 20% of total cover: <u> </u>								Prevalence Index = B/A =	<u>2.41</u>
50% of total cover: <u> </u> 20% of total cover: <u> </u>								Hydrophytic Vegetation Indicators:	
50% of total cover: <u> </u> 20% of total cover: <u> </u>								Y Dominance Test is >50%	
50% of total cover: <u> </u> 20% of total cover: <u> </u>								Y Prevalence Index is ≤3.0	
50% of total cover: <u> </u> 20% of total cover: <u> </u>								N Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
50% of total cover: <u> </u> 20% of total cover: <u> </u>								N Problematic Hydrophytic Vegetation ¹ (Explain)	
50% of total cover: <u> </u> 20% of total cover: <u> </u>								¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
50% of total cover: <u> </u> 20% of total cover: <u> </u>								Hydrophytic Vegetation Present? Yes <u> </u> No <u> </u>	

Remarks: #19 - alt, lance leaves, flower



Site 127: Soil, July 20, 2017



Site 127: Soil, July 20, 2017



Site 127: Vegetation, looking east on July 20, 2017



Site 127: Vegetation, looking south on July 20, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: JNU/Haines Date: 7.20.2017
 Applicant/Owner: Constance Sampling Point #: 131
 Investigator(s): Don Jewell; Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.) 59.4067 Long. 136.2834 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☒ Field Map #:
 Subregion (circle one) SE Southcentral Western Aleutian Interior Northern Landform: hillside Slope (%): Aspect: SE
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex concave NWI classification: UPLAND
 Photo nos./descriptions: 412/413 Soil; 414-417 NESW Camera #: MD5 Veg Type (Vierck Level 4 or other): CATS
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <u> </u>	Is the sampled area within a wetland? Yes <u> </u> No <input checked="" type="checkbox"/> Remarks (e.g., marginal?): <u> </u>
Hydric Soil Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 Indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u>Alnus sinuata</u>	<u>80</u>	<u>Y</u>	<u>FAC</u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>3</u>	(A)
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>4</u>	(B)
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
Total Tree Cover: <u>80</u>								Percent of Dominant Species That are OBL, FACW, or FAC: <u>75</u> (A/B)	
50% of total cover: <u>40</u> 20% of total cover: <u>16</u>								Prevalence Index worksheet:	
Sapling/Shrub Stratum (woody plants < 3" dbh)								Total % Cover of:	
Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	Multiply by:	
1. <u>Alnus sin</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	OBL species	X1= <u> </u>
2. <u>Oplopan haw</u>	<u>2</u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	FACW species	X2= <u>10</u>
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	FAC species	X3= <u>372</u>
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	FACU species	X4= <u>144</u>
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	UPL + NL species	X5= <u> </u>
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	12. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Column Totals:	<u>165</u> (A) <u>526</u> (B)
Total Sapling/Shrub Cover: <u>16</u>								Prevalence Index = B/A = <u>3.19</u>	
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>									
Herb Stratum								Hydrophytic Vegetation Indicators:	
Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.	<u>Y</u> Dominance Test is >50%	
1. <u>Athy filifera</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	12. <u>Cal can</u>	<u>2</u>	<u> </u>	<u>FAC</u>	<u>N</u> Prevalence Index is ≤3.0	
2. <u>Gymn dig</u>	<u>20</u>	<u>Y</u>	<u>FAC-U</u>	13. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>U</u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
3. <u>Urt dio</u>	<u>8</u>	<u> </u>	<u>FAC-U</u>	14. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>N</u> Problematic Hydrophytic Vegetation ¹ (Explain)	
4. <u>Tricella tri</u>	<u>8</u>	<u> </u>	<u>FAC</u>	15. <u> </u>	<u> </u>	<u> </u>	<u> </u>	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
5. <u>Gal triflorum</u>	<u>2</u>	<u> </u>	<u>FAC</u>	16. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
6. <u>Strep amp</u>	<u>3</u>	<u> </u>	<u>FACU</u>	17. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
7. <u>Strep ras</u>	<u>2</u>	<u> </u>	<u>FACU</u>	18. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
8. <u>Egri arr</u>	<u>2</u>	<u> </u>	<u>FAC</u>	19. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
9. <u>Val sitch</u>	<u>10</u>	<u> </u>	<u>FAC</u>	20. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
10. <u>Herac lan</u>	<u>3</u>	<u> </u>	<u>FAC-U</u>	21. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
11. <u>Viola glab</u>	<u>5</u>	<u> </u>	<u>FACW</u>	22. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
Total Herb Cover: <u>105</u>								Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <u> </u>	
50% of total cover: <u>52.5</u> 20% of total cover: <u>21</u>									
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u> </u> % of bare ground: <u>20</u>									
% Cover of Wetland Bryophytes <u>0</u> % Total Cover of Bryophytes <u>0</u> % (where applicable)									

Remarks: bare ground = leaves + branches / litter

SOIL

Sampling Point #: 131

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (In.)	Horizon (opt.)	Soil Matrix		Redox Features				Texture	α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type ¹	Loc ²			
0-2	Oi									
2-3	Oe									
3-8	A	7.5YR 2.5/2						SL		10YR2/2
8-11	B ₂	7.5YR 2.5/3						SiL	neg	
11-20	B ₂	5YR 2.5/2						SiL		20% cobbles

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- ☒ Histosol or Histel (A1) (≥ 16 " organic surface, sat'd during wet period of growing season)
- ☒ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤ 2)
- ☒ Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____" in this pit)
- ☒ Thick Dark Surface (A12)
- ☒ Alaska Gleyed (A13)
- ☒ Alaska Redox (A14)
- ☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change⁴ (TA4)
- ☒ Alaska Alpine Swales (TA5)
- ☒ Alaska Redox with 2.5Y Hue
- ☒ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ☒ Other (e.g., see p.81 of 2007 Supplement; explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present)

Type: none

Depth (inches) _____

Drainage Class: WD

Soil Map Unit Name: _____

Hydric Soil Present? Yes _____ No ☒Comments: 3-8 = ~~7.5YR 2.5/2~~ 10YR2/2

-
-
-

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2) (w/in 12")
- ☒ Saturation (A3) (w/in 12")
- ☒ Water Marks (B1)
- ☒ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☒ Iron Deposits (B5)
- ☒ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☒ Marl Deposits (B15)
- ☒ Hydrogen Sulfide Odor (C1) (w/in 12")
- ☒ Dry-Season Water Table (C2) (w/in 24")
- ☒ Other (explain) _____

Secondary Indicators (at least 2 are required)

- ☒ Water-Stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ☒ Presence of Reduced Iron (C4) (pos. α, α or soil color change w/in 12")
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3) (w/in 24", can perch H₂O w/in 12")
- ☒ Microtopographic Relief (D4) (caused by water)
- ☒ FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes _____ No ☒ Depth of water (in.) _____Water Table Present? Yes _____ No ☒ Depth to water (in.) _____

Seeping in at that depth but not yet filled?: _____

Saturation Present? Yes _____ No ☒ Depth to sat. (in.) _____

(includes capillary fringe)

Epi Endo Unknown

Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 131: Soil, July 20, 2017



Site 131: Soil, July 20, 2017



Site 131: Vegetation, looking north on July 20, 2017



Site 131: Vegetation, looking west on July 20, 2017

WETLAND DETERMINATION DATA FORM -- Alaska Region

Project: Palmer VMS Borough/City: JNU/Haines Date: 7-20-2017
 Applicant/Owner: Constantine Sampling Point #: 132
 Investigator(s): Doug Jewell; Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.) 59.40657 Long. 136.28299 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☐ Field Map #:
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Slope Slope (%): 5 Aspect: S
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PSS/EM1B
 Photo nos./descriptions: 418/419 Soil; 422-423 NEW Camera #: MDS Veg Type (Vioreck Level 4 or other): CCRS
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: ☐ If no, explain. HGM type: Slope
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the sampled area within a wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 Indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:			
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC: <u>2</u> (A)			
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total Number of Dominant Species Across All Strata: <u>2</u> (B)			
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Percent of Dominant Species That are OBL, FACW, or FAC: <u>100</u> (A/B)			
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet:			
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total % Cover of: Multiply by:			
Total Tree Cover: <u>0</u>								OBL species <u>0</u> X1= <u>0</u>			
50% of total cover: <u> </u> 20% of total cover: <u> </u>								FACW species <u>20</u> X2= <u>40</u>			
Sapling/Shrub Stratum (woody plants < 3" dbh)								FAC species <u>127</u> X3= <u>381</u>			
1. <u>Salix bar</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	FACU species <u>18</u> X4= <u>192</u>			
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	UPL + NL species <u> </u> X5= <u> </u>			
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Column Totals: <u>195</u> (A) <u>613</u> (B)			
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index = B/A = <u>3.14</u>			
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Hydrophytic Vegetation Indicators:			
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	12. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Y Dominance Test is >50%			
Total Sapling/Shrub Cover: <u>30</u>								N Prevalence Index is ≤3.0			
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>								Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)			
Herb Stratum								Problematic Hydrophytic Vegetation ¹ (Explain)			
1. <u>Athy. Rize fern</u>	<u>90</u>	<u>Y</u>	<u>FAC</u>	12. <u> </u>	<u> </u>	<u> </u>	<u> </u>	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
2. <u>Senecio. trig.</u>	<u>20</u>	<u> </u>	<u>FACW</u>	13. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			
3. <u>Stroph. and.</u>	<u>8</u>	<u> </u>	<u>FACU</u>	14. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
4. <u>Gymno. dry</u>	<u>5</u>	<u> </u>	<u>FACU</u>	15. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
5. <u>Port. dio.</u>	<u>25</u>	<u> </u>	<u>FACU</u>	16. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
6. <u>Hera. lan.</u>	<u>10</u>	<u> </u>	<u>FACU</u>	17. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
7. <u>Val. sitch.</u>	<u>7</u>	<u> </u>	<u>FAC</u>	18. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
8. <u>Carrot - Anglin?</u>	<u>I</u>	<u> </u>	<u> </u>	19. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	20. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	21. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	22. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
Total Herb Cover: <u>165</u>											
50% of total cover: <u>82.5</u> 20% of total cover: <u>33</u>											
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u> </u> % of bare ground: <u>0</u>											
% Cover of Wetland Bryophytes <u> </u> % Total Cover of Bryophytes <u>10</u> %											
(where applicable)											
Remarks:											

SOIL

Sampling Point #: 132

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (in.)	Horizon (opt.)	Soil Matrix		Redox Features				a,α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-5	O _i								
5-18	O _a							neg	

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- Y Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)
N Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
N Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____" in this pit)
N Thick Dark Surface (A12)
N Alaska Gleyed (A13)
N Alaska Redox (A14)
N Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- N Alaska Color Change⁴ (TA4)
N Alaska Alpine Swales (TA5)
N Alaska Redox with 2.5Y Hue
N Alaska Gleyed without Hue 5Y or Redder Underlying Layer
N Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.
⁴Give details of color change in Remarks.

Restrictive Layer (if present)

Type: NONE

Depth (inches) _____

Drainage Class: PD

Soil Map Unit Name: _____

Hydric Soil Present?

Yes ☒No ☐

Comments:

-
-
-

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- N Surface Water (A1) N Surface Soil Cracks (B6)
Y High Water Table (A2) (w/in 12") N Inundation Visible on Aerial Imagery (B7)
Y Saturation (A3) (w/in 12") N Sparsely Vegetated Concave Surface (B8)
N Water Marks (B1) N Marl Deposits (B15)
N Sediment Deposits (B2) N Hydrogen Sulfide Odor (C1) (w/in 12")
N Drift Deposits (B3) N Dry-Season Water Table (C2) (w/in 24")
N Algal Mat or Crust (B4) N Other (explain) _____
N Iron Deposits (B5)

Secondary Indicators (at least 2 are required)

- N Water-Stained Leaves (B9)
N Drainage Patterns (B10)
N Oxid'd Rhizospheres on Living Roots (C3) (within 12")
N Presence of Reduced Iron (C4) (pos. α,α or soil color change w/in 12")
N Salt Deposits (C5)
N Stunted or Stressed Plants (D1)
N Geomorphic Position (D2)
N Shallow Aquitard (D3) (w/in 24", can perch H₂O w/in 12")
N Microtopographic Relief (D4) (caused by water)
N FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes ☐ No ☒ Depth of water (in.) _____Water Table Present? Yes ☒ No ☐ Depth to water (in.) 12Seeping in at that depth but not yet filled?: 9" seepingSaturation Present? Yes ☒ No ☐ Depth to sat. (in.) 2

(Includes capillary fringe)

Epi Endo Unknown

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 132: Soil, July 20, 2017



Site 132: Soil, July 20, 2017



Site 132: Vegetation, looking north on July 20, 2017



Site 132: Vegetation, looking south on July 20, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: Ilina Date: 7.20.2017
 Applicant/Owner: Conglomerate Sampling Point #: 134
 Investigator(s): Doug Jewell; Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.40572 Long. 136.28073 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☒ Field Map #: 5
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: low slope Slope (%): 1 Aspect: S
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: PFOYSSIC
 Photo nos./descriptions: 430/31 Soil; 432-435 NESW Camera #: MOS Veg Type (Vioreck Level 4 or other): Open Unshaded Forest
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: ☐ If no, explain. HGM type: Slope
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the sampled area within a wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 Indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u>Picea sit</u>	<u>85</u>	<u>Y</u>	<u>FAC-U</u>	5. _____	_____	_____	_____	<u>13</u>	(A)
2. <u>Tsuga het</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	6. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata:	<u>15</u> (B)
3. <u>Tsuga mert</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	7. _____	_____	_____	_____	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>86.6%</u> (A/B)
4. _____	_____	_____	_____	8. _____	_____	_____	_____	Prevalence Index worksheet:	
Total Tree Cover: <u>23</u>								Total % Cover of:	
50% of total cover: <u>11.5</u> 20% of total cover: <u>4.6</u>								Multiply by:	
Sapling/Shrub Stratum (woody plants < 3" dbh)								OBL species <u>15</u> X1= <u>15</u>	
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	FACW species <u>63</u> X2= <u>126</u>	
1. <u>Alnus sin</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>	7. <u>Vib edula</u>	<u>8</u>	_____	<u>FAC-U</u>	FAC species <u>14</u> X3= <u>423</u>	
2. <u>Myr ferr</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	8. <u>Sorbus sikh</u>	<u>2</u>	_____	<u>FACU</u>	FACU species <u>41</u> X4= <u>164</u>	
3. <u>Vacc oval</u>	<u>8</u>	_____	<u>FAC</u>	9. <u>Tsuga het</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	UPL + NL species <u>0</u> X5= <u>0</u>	
4. <u>Cornus can</u>	<u>3</u>	_____	<u>FACU</u>	10. <u>Vacc alask</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	Column Totals: <u>260</u> (A) <u>720</u> (B)	
5. <u>Rubus</u>	_____	_____	_____	11. <u>Rubus ped</u>	<u>8</u>	_____	<u>FAC</u>	Prevalence Index = B/A = <u>2.8</u>	
6. <u>Salix sit</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	12. <u>Tsuga mert</u>	<u>5</u>	_____	<u>FAC</u>		
Total Sapling/Shrub Cover: <u>104</u>									
50% of total cover: <u>52</u> 20% of total cover: <u>20.8</u>									
Herb Stratum								Hydrophytic Vegetation Indicators:	
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	Y Dominance Test is >50% Y Prevalence Index is ≤3.0	
1. <u>Equi flav</u>	<u>15</u>	<u>Y</u>	<u>OBL</u>	12. <u>Falco Helt (Verir)</u>	<u>5</u>	_____	<u>FAC</u>	N Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
2. <u>Equi arve</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	13. <u>Viola lam pur</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>	N Problematic Hydrophytic Vegetation ¹ (Explain)	
3. <u>Sarg can</u>	<u>20</u>	<u>Y</u>	<u>FACW</u>	14. <u>List cold</u>	<u>1</u>	_____	<u>FACU</u>		
4. <u>Stript amp</u>	<u>5</u>	_____	<u>FAC-U</u>	15. <u>Tinella tri</u>	<u>3</u>	_____	<u>FAC</u>		
5. <u>Val sikh</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	16. <u>Carex sp.</u>	<u>2</u>	_____	_____		
6. <u>Sen triang</u>	<u>0</u>	<u>Y</u>	<u>FACW</u>	17. <u>Geranium eri</u>	<u>3</u>	_____	<u>FACU</u>		
7. <u>Plat delata</u>	<u>7</u>	_____	<u>FACW</u>	18. <u>Fauria cista</u>	<u>1</u>	_____	<u>OBL</u>		
8. <u>Parn pal</u>	<u>5</u>	_____	<u>FACW</u>	19. <u>Geranium eri</u>	<u>3</u>	_____	<u>FACU</u>		
9. <u>Leptac pte</u>	<u>8</u>	<u>Y</u>	<u>FACW</u>	20. <u>Geranium eri</u>	<u>3</u>	_____	<u>FACU</u>		
10. <u>Trident BUR</u>	<u>2</u>	_____	<u>FACU</u>	21. _____	_____	_____	_____		
11. <u>Aron delph</u>	<u>2</u>	_____	<u>FAC</u>	22. _____	_____	_____	_____		
Total Herb Cover: <u>180</u>								Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
50% of total cover: <u>90</u> 20% of total cover: <u>36</u>									
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: _____ % of bare ground: _____									
% Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes _____ % (where applicable)									
Remarks:									

SOIL

Sampling Point #: 134

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

[illegible]

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- Y Histosol or Histel (A1) ($\geq 18\%$ organic surface, sat'd during wet period of growing season)
- N Histic Epipedon (A2) (8-16% organics, sat'd, underlain by mineral soil with chroma ≤ 2)
- N Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____" in this pit)
- N Thick Dark Surface (A12)
- N Alaska Gleyed (A13)
- N Alaska Redox (A14)
- N Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- | | |
|----------|--|
| <u>2</u> | Alaska Color Change ⁴ (TA4) |
| <u>2</u> | Alaska Alpine Swales (TA5) |
| <u>2</u> | Alaska Redox with 2.5Y Hue |
| <u>2</u> | Alaska Gleyed without Hue 5Y or Redder
Underlying Layer |
| <u>2</u> | Other (e.g., see p.91 of 2007
Supplement; explain in Remarks) |

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

⁴Give details of color change in Remarks.

Restrictive Layer (if present)

Type: None

Depth (inches)

Drainage Class: PD

Soil Map Unit Name:

Hydric Soil Present? Yes ☒ No ☐

Comments:

- 1.
- 2.
- 3.

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- | | |
|---|--|
| <u>Y</u> Surface Water (A1) | <u>N</u> Surface Soil Cracks (B6) |
| <u>Y</u> High Water Table (A2) (w/in 12") | <u>N</u> Inundation Visible on Aerial Imagery (B7) |
| <u>Y</u> Saturation (A3) (w/in 12") | <u>N</u> Sparsely Vegetated Concave Surface (B8) |
| <u>N</u> Water Marks (B1) | <u>N</u> Marl Deposits (B15) |
| <u>A</u> Sediment Deposits (B2) | <u>N</u> Hydrogen Sulfide Odor (C1) (w/in 12") |
| <u>N</u> Drift Deposits (B3) | <u>N</u> Dry-Season Water Table (C2) (w/in 24") |
| <u>N</u> Algal Mat or Crust (B4) | <u>N</u> Other (explain) |
| <u>N</u> Iron Deposits (B5) | |

Secondary Indicators (at least 2 are required)

- ☒ Water-Stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ☒ Presence of Reduced Iron (C4)
(pos. α , α or soil color change w/in 12")
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3)
(w/in 24", can perch H₂O w/in 12")
- ☒ Microtopographic Relief (D4) (caused by water)
- ☒ FAC Neutral Test (D5)
(# OBL+FAcW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes ☒ No ☐ Depth of water (in.) < 1

Water Table Present? Yes ☒ No ☐ Depth to water (in.) 4

Seeping in at that depth but not yet filled?: 7

Saturation Present? Yes ☒ No ☐ Depth to sat. (in.) 0

(includes capillary fringe) Ep Endo Unknown

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 134: Soil, July 20, 2017



Site 134: Soil, July 20, 2017



Site 134: Vegetation, looking north on July 20, 2017



Site 134: Vegetation, looking south on July 20, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer vms Borough/City: JNU/Haines Date: 7.20.2017
 Applicant/Owner: Constantine Sampling Point #: 135
 Investigator(s): Doug Jewell, Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.) 59.42373 Long. 136.24394 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☒ Field Map #: 1
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Remnant Shrubland Slope (%): Aspect: S
 Local relief: Shape across slope: linear / convex / (concave) Shape up/downslope: linear / convex / (concave) NWI classification: UPLAND
 Photo nos./descriptions: 486-84 SOIL; 438-441 NESW Camera #: M05 Veg Type (Viereck Level 4 or other): CWTS
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: ☐ If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the sampled area within a wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Remarks (e.g., marginal?): <u> </u>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>		

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:			
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:			
1. <u>Pop. tri</u> (wrong stratum; see below)				6. <u> </u>				4	(A)		
2. <u> </u>				7. <u> </u>				Total Number of Dominant Species Across All Strata:	6 (B)		
3. <u> </u>				8. <u> </u>				Percent of Dominant Species That are OBL, FACW, or FAC:	67% (A/B)		
4. <u> </u>								Prevalence Index worksheet:			
Total Tree Cover: <u> </u>								Total % Cover of: <u> </u> Multiply by: <u> </u>			
50% of total cover: <u> </u> 20% of total cover: <u> </u>								OBL species <u>2</u> X1= <u>2</u>			
Sapling/Shrub Stratum (woody plants < 3" dbh)								FACW species <u>20</u> X2= <u>40</u>			
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	FAC species <u>76</u> X3= <u>228</u>			
1. <u>Alnus sin</u>	40	Y	FAC	7. <u>Salix bar</u>	10		FAC	FACU species <u>38</u> X4= <u>152</u>			
2. <u>Betula picea</u>	10		NL	8. <u>Salix alex</u>	3		FAC	UPL + NL species <u>12</u> X5= <u>60</u>			
3. <u>Pop. tri</u>	15	Y	FACU	9. <u>Salix merck</u>	2		FACW	Column Totals: <u>148</u> (A) <u>482</u> (B)			
4. <u>Salix com</u>	8		FAC	10. <u>Vib edule</u>	3		FACU	Prevalence Index = B/A = <u>3.26</u>			
5. <u>Shepherdia can</u>	5		FACU	11. <u> </u>							
6. <u>Amel aln</u>	2		UPL	12. <u> </u>							
Total Sapling/Shrub Cover: <u>98</u>											
50% of total cover: <u>49</u> 20% of total cover: <u>19.6</u>											
Herb Stratum								Hydrophytic Vegetation Indicators:			
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	Y Dominance Test is >50%			
1. <u>Pyrola as</u>	5	Y	FACU	12. <u>Equi arv</u>	7	Y	FAC	N Prevalence Index is ≤3.0			
2. <u>Epi ang</u>	2		FACU	13. <u>Equi nara</u>	10	Y	FACW	N Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)			
3. <u>Solidago</u>	2		FACU	14. <u>Packera pauc</u>	2		FAC	N Problematic Hydrophytic Vegetation ¹ (Explain)			
4. <u>Chama</u>	2			15. <u> </u>				¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
5. <u>Gal triflorum</u>	3		FAC	16. <u> </u>							
6. <u>Orthill sec</u>	2		FACU	17. <u> </u>							
7. <u>Tarax off</u>	2		FACU	18. <u> </u>							
8. <u>Urtica dioica</u> (C)	2		FACU	19. <u> </u>							
9. <u>Gal can</u>	3		FAC	20. <u> </u>							
10. <u>Equi prat</u>	8	Y	FACW	21. <u> </u>							
11. <u>Equi fluv</u>	2		OBL	22. <u> </u>							
Total Herb Cover: <u>50</u>								Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			
50% of total cover: <u>25</u> 20% of total cover: <u>20</u>											
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u> </u> % of bare ground: <u>15</u>											
% Cover of Wetland Bryophytes <u>0</u> % Total Cover of Bryophytes <u>3</u> %											

Remarks: 3 1/2 1/2 1/2 1/2 10. smaller than, white teeth, thick, long branches; 50% hollow
 Maybe an old floodplain Baro ground = leaf litter

SOIL

Sampling Point #: 135

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (in.)	Horizon (opt.)	Soil Matrix		Redox Features				a,a dip. (pos/ neg)		Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture		
0-14	B ₁	5Y5/1	60	2.5YR4/6	10	C	RC, PL	SiL	neg	See comments
		2.5Y3/1	30							
14-20	B ₂	5Y3/1	97	5YR4/6	3		PL	Sa		15% gravel

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- ☒ Histosol or Histel (A1) ($\geq 18^{\circ}$ organic surface, sat'd during wet period of growing season)
- ☒ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤ 2)
- ☒ Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____ " in this pit)
- ☒ Thick Dark Surface (A12)
- ☒ Alaska Gleyed (A13)
- ☒ Alaska Redox (A14)
- ☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change⁴ (TA4)
- ☒ Alaska Alpine Swales (TA5)
- ☒ Alaska Redox with 2.5Y Hue
- ☒ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ☒ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present)

Type: NONE

Depth (inches) _____

Drainage Class: WD

Soil Map Unit Name: _____

Hydric Soil Present?

Yes ☒No ☒

Comments:

- 5YR4/6 Redox color B₁
1. Redox is bordering 10% in B₁ layer. Likely relic given amount/lack of hydrology/landscape position.
- 2.
- 3.

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2) (w/in 12")
- ☒ Saturation (A3) (w/in 12")
- ☒ Water Marks (B1)
- ☒ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☒ Iron Deposits (B5)
- ☒ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☒ Marl Deposits (B15)
- ☒ Hydrogen Sulfide Odor (C1) (w/in 12")
- ☒ Dry-Season Water Table (C2) (w/in 24")
- ☒ Other (explain)

Secondary Indicators (at least 2 are required)

- ☒ Water-Stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ☒ Presence of Reduced Iron (C4) (pos. a,a or soil color change w/in 12")
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3) (w/in 24", can perch H₂O w/in 12")
- ☒ Microtopographic Relief (D4) (caused by water)
- ☒ FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes ☐ No ☒Water Table Present? Yes ☐ No ☒Seeping in at that depth but not yet filled? ☐Saturation Present? Yes ☐ No ☒

(Includes capillary fringe)

Depth of water (in.) _____

Depth to water (in.) _____

Depth to sat. (in.) _____

Epi Endo Unknown

Wetland Hydrology Present?

Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No hydrology indicators present. Appears to be relic stream channel, no signs of recent flow.



Site 135: Soil, July 20, 2017



Site 135: Soil, July 20, 2017



Site 135: Vegetation, looking north on July 20, 2017



Site 135: Vegetation, looking south on July 20, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: JANUARY/HAINES Date: 7.21.2017
 Applicant/Owner: Constantine Sampling Point #: 147
 Investigator(s): D. Jewell, Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.42783 Long. 136.28159 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☐ Field Map #:
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Slope (%): Aspect: N
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: Upland
 Photo nos./descriptions: 522/23 Soil; 524-527 NBSW Camera #: MOS Veg Type (Viereck Level 4 or other): Open Shrubland
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: ☐ If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Is the sampled area within a wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")							
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.
1. <u>Tsuga het</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>
2. <u>Pop tri</u>	<u>3</u>	<u> </u>	<u>FAC-U</u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>
Total Tree Cover: <u>18</u>							

50% of total cover: 920% of total cover: 3.6

Sapling/Shrub Stratum (woody plants < 3" dbh)

Abs. Cov. %	Dom?	Ind.	Abs. Cov. %	Dom?	Ind.
1. <u>Tsuga het</u>	<u>5</u>	<u>FAC</u>	7. <u>Vacc alake</u>	<u>3</u>	<u>FAC</u>
2. <u>Picea sitchensis</u>	<u>15</u>	<u>Y</u>	8. <u>Cornus can</u>	<u>2</u>	<u>FAC-U</u>
3. <u>Ople honr</u>	<u>20</u>	<u>Y</u>	9. <u>Vib edule</u>	<u>3</u>	<u>FAC-U</u>
4. <u>Ribes lac</u>	<u>15</u>	<u>Y</u>	10. <u>Pop tri</u>	<u>10</u>	<u>FAC-U</u>
5. <u>Rubus spec</u>	<u>5</u>	<u> </u>	11. <u> </u>	<u> </u>	<u> </u>
6. <u>Cornus stel</u>	<u>5</u>	<u> </u>	12. <u> </u>	<u> </u>	<u> </u>

Total Sapling/Shrub Cover: 8350% of total cover: 41.520% of total cover: 16.6

Herb Stratum

Abs. Cov. %	Dom?	Ind.	Abs. Cov. %	Dom?	Ind.
1. <u>Epi ang</u>	<u>10</u>	<u>FAC-U</u>	12. <u> </u>	<u> </u>	<u> </u>
2. <u>Gymo dry</u>	<u>70</u>	<u>Y</u>	13. <u> </u>	<u> </u>	<u> </u>
3. <u>Tara off</u>	<u>7</u>	<u>FAC-U</u>	14. <u> </u>	<u> </u>	<u> </u>
4. <u>Gal triflor</u>	<u>2</u>	<u>FAC</u>	15. <u> </u>	<u> </u>	<u> </u>
5. <u>Oxmi sec</u>	<u>18</u>	<u>FAC-U</u>	16. <u> </u>	<u> </u>	<u> </u>
6. <u>Viola bps</u>	<u>3</u>	<u> </u>	17. <u> </u>	<u> </u>	<u> </u>
7. <u>Monarda uni</u>	<u>3</u>	<u>FAC-U</u>	18. <u> </u>	<u> </u>	<u> </u>
8. <u>Tiarrella tri</u>	<u>18</u>	<u>FAC</u>	19. <u> </u>	<u> </u>	<u> </u>
9. <u>Strep anup</u>	<u>2</u>	<u>FAC-U</u>	20. <u> </u>	<u> </u>	<u> </u>
10. <u>Egri Arv</u>	<u>2</u>	<u>FAC</u>	21. <u> </u>	<u> </u>	<u> </u>
11. <u>Athy fil-fem</u>	<u>3</u>	<u>FAC</u>	22. <u> </u>	<u> </u>	<u> </u>

Total Herb Cover: 11150% of total cover: 55.520% of total cover: 22.2Circular 1/10-ac plot ☒ or other plot dimension: % of bare ground: 5% Cover of Wetland Bryophytes 0 % Total Cover of Bryophytes 20 %
(where applicable)

Remarks:

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)Total Number of Dominant Species Across All Strata: 5 (B)Percent of Dominant Species That are OBL, FACW, or FAC: 40% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	X1= <u>0</u>
FACW species <u>0</u>	X2= <u>0</u>
FAC species <u>58</u>	X3= <u>174</u>
FACU species <u>151</u>	X4= <u>604</u>
UPL + NL species <u>18</u>	X5= <u>108</u>
Column Totals: <u>209</u> (A)	<u>796</u> (B)

Prevalence Index = B/A = 3.76

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%
N Prevalence Index is ≤3.0

N Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

N Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes ☐ No ☒

SOIL

Sampling Point #: 147

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (in.)	Horizon (opt.)	Soil Matrix		Redox Features				Texture	α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type ¹	Loc ²			
0-3	O _i									
3-5	B ₁	2.5Y 3/3						SiL		
5-10	B ₂	2.5Y 3/1						Sand	neg	
10-20	B ₃	5Y 8/2						SaL	neg	

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- ☒ Histosol or Histel (A1) (≥ 16 " organic surface, sat'd during wet period of growing season)
- ☒ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤ 2)
- ☒ Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____ in this pit)
- ☒ Thick Dark Surface (A12)
- ☒ Alaska Gleyed (A13)
- ☒ Alaska Redox (A14)
- ☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change⁴ (TA4)
- ☒ Alaska Alpine Swales (TA5)
- ☒ Alaska Redox with 2.5Y Hue
- ☒ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ☒ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present)

Type: none

Depth (inches) _____

Drainage Class: WD

Soil Map Unit Name: _____

Hydric Soil Present?

Yes _____

No ☒

Comments:

-
-
-

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2) (w/in 12")
- ☒ Saturation (A3) (w/in 12")
- ☒ Water Marks (B1)
- ☒ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☒ Iron Deposits (B5)
- ☒ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☒ Marl Deposits (B15)
- ☒ Hydrogen Sulfide Odor (C1) (w/in 12")
- ☒ Dry-Season Water Table (C2) (w/in 24")
- ☒ Other (explain) _____

Secondary Indicators (at least 2 are required)

- ☒ Water-Stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ☒ Presence of Reduced Iron (C4) (pos. α, α or soil color change w/in 12")
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3) (w/in 24", can perch H₂O w/in 12")
- ☒ Microtopographic Relief (D4) (caused by water)
- ☒ FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes _____ No ☒

Water Table Present? Yes _____ No ☒

Seeping in at that depth but not yet filled?: _____

Saturation Present? Yes _____ No ☒

(includes capillary fringe)

Depth of water (in.) _____

Depth to water (in.) _____

Depth to sat. (in.) _____

Epi Endo Unknown

Wetland Hydrology Present?

Yes _____

No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 147: Soil, July 21, 2017



Site 147: Soil, July 21, 2017



Site 147: Vegetation, looking north on July 21, 2017



Site 147: Vegetation, looking south on July 21, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: JNU/Haines Date: 7.21.2017
 Applicant/Owner: Constantine Sampling Point #: 148
 Investigator(s): Doug Jewell; Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.42948 Long. 136.27407 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☒ Field Map #:
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Slope (%): Aspect:
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: UPLAND
 Photo nos./descriptions: 525/29 soil; 530-533 veg Camera #: M05 Veg Type (Viereck Level 4 or other): Open Tall Shrub
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	Is the sampled area within a wetland? Yes <u> </u> No <input checked="" type="checkbox"/>	Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>		

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:			
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:			
1. <u>Pop tri</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>0</u>	(A)		
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total Number of Dominant Species Across All Strata:	<u>4</u> (B)		
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>0</u> (A/B)		
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet:			
Total Tree Cover: <u>10</u>								Total % Cover of: <u> </u> Multiply by: <u> </u>			
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>								OBL species <u>0</u> X1= <u>0</u>			
Sapling/Shrub Stratum (woody plants < 3" dbh)								FACW species <u>0</u> X2= <u>0</u>			
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	FAC species <u>0</u> X3= <u>0</u>			
1. <u>Pop tri</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	FACU species <u>120</u> X4= <u>480</u>			
2. <u>Shepherdia can</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	UPL + NL species <u>0</u> X5= <u>0</u>			
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Column Totals: <u>120</u> (A) <u>480</u> (B)			
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index = B/A = <u>4.25 4.0</u>			
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	11. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	12. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
Total Sapling/Shrub Cover: <u>40</u>											
50% of total cover: <u>20</u> 20% of total cover: <u>8</u>											
Herb Stratum								Hydrophytic Vegetation Indicators:			
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	<u>N</u> Dominance Test is >50%			
1. <u>Dryas drum</u>	<u>70</u>	<u>Y</u>	<u>FACU</u>	12. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>N</u> Prevalence Index is ≤3.0			
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	13. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>N</u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)			
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	14. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>N</u> Problematic Hydrophytic Vegetation ¹ (Explain)			
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	15. <u> </u>	<u> </u>	<u> </u>	<u> </u>	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	16. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	17. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	18. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	19. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	20. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	21. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	22. <u> </u>	<u> </u>	<u> </u>	<u> </u>				
Total Herb Cover: <u>70</u>								Hydrophytic Vegetation Present? Yes <u> </u> No <input checked="" type="checkbox"/>			
50% of total cover: <u>35</u> 20% of total cover: <u>14</u>											
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u> </u> % of bare ground: <u>15 ±</u>											
% Cover of Wetland Bryophytes <u>0</u> % Total Cover of Bryophytes <u>10</u> %											
(where applicable)											

Remarks:

* bare ground mostly littered w/ dead dryas

SOIL

Sampling Point #: 48

Profile Description: (Describe to the depth needed to document the Indicator or confirm the absence of Indicators)

Depth (in.)	Horizon (opt.)	Soil Matrix Color (moist)	%	Redox Features Color (moist)	%	Type ¹	Loc ²	Texture	α, α dip. (pos/ neg)	Remarks (or use comment number)
0-5	B ₁	2.5Y3/1						Si L	neg	
5-20	B ₂	5Y2.5/1						Sand	neg	variegated sand

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- ☒ Histosol or Histel (A1) ($\geq 18''$ organic surface, sat'd during wet period of growing season)
- ☒ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤ 2)
- ☒ Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____ " in this pit)
- ☒ Thick Dark Surface (A12)
- ☒ Alaska Gleyed (A13)
- ☒ Alaska Redox (A14)
- ☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change⁴ (TA4)
- ☒ Alaska Alpine Swales (TA5)
- ☒ Alaska Redox with 2.5Y Hue
- ☒ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present)

Type: none

Depth (inches) 0

Drainage Class: WD

Soil Map Unit Name:

Hydric Soil Present? Yes No ☒

Comments:

1. cobbles sta in B₂ layer @ 30%
- 2.
- 3.

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2) (w/in 12")
- ☒ Saturation (A3) (w/in 12")
- ☒ Water Marks (B1)
- ☒ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☒ Iron Deposits (B5)
- ☒ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☒ Marl Deposits (B15)
- ☒ Hydrogen Sulfide Odor (C1) (w/in 12")
- ☒ Dry-Season Water Table (C2) (w/in 24")
- ☒ Other (explain)

Secondary Indicators (at least 2 are required)

- ☒ Water-Stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ☒ Presence of Reduced Iron (C4) (pos. α, α or soil color change w/in 12")
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3) (w/in 24", can perch H₂O w/in 12")
- ☒ Microtopographic Relief (D4) (caused by water)
- ☒ FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes No ☒

Water Table Present? Yes No ☒

Seeping in at that depth but not yet filled?: ☒

Saturation Present? Yes No ☒

(includes capillary fringe)

Depth of water (in.)

Depth to water (in.)

Depth to sat. (in.)

Epi Endo Unknown

Wetland Hydrology Present? Yes No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 148: Soil, July 21, 2017



Site 148: Soil, July 21, 2017



Site 148: Vegetation, looking north on July 21, 2017



Site 148: Vegetation, looking west on July 21, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer VMS Borough/City: JNU/HAINES Date: 7.21.2017
 Applicant/Owner: Constantine Sampling Point #: 152
 Investigator(s): Doug Jewell; eoin cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.42566 Long. 136.29033 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☐ Field Map #: ☐
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: ☐ Slope (%): ☐ Aspect: ☐
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: UPLAND
 Photo nos./descriptions: 552/53 SOILS; 554-557 NESW Camera #: M25 Veg Type (Viereck Level 4 or other): Open Herbaceous
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: ☐ If no, explain. HGM type: ☐
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Is the sampled area within a wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")							
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.
1. <u>Tsuga het</u>	<u>22</u>	<u>Y</u>	<u>FAC</u>	5. <u></u>	<u></u>	<u></u>	<u></u>
2. <u>Picea sitchensis</u>	<u>15</u>	<u>Y</u>	<u>FACU</u>	6. <u></u>	<u></u>	<u></u>	<u></u>
3. <u>Betula papyrifera</u>	<u>3</u>	<u></u>	<u>FACU</u>	7. <u></u>	<u></u>	<u></u>	<u></u>
4. <u></u>	<u></u>	<u></u>	<u></u>	8. <u></u>	<u></u>	<u></u>	<u></u>

Total Tree Cover: 4050% of total cover: 2020% of total cover: 8

Sapling/Shrub Stratum (woody plants < 3" dbh)

	Abs.Cov.%	Dom?	Ind.		Abs.Cov.%	Dom?	Ind.
1. <u>Oxyc. horr</u>	<u>30</u>	<u>Y</u>	<u>FAC-U</u>	7. <u>Ribes lac</u>	<u>2</u>	<u>_____</u>	<u>FAC</u>
2. <u>Tsuga het</u>	<u>7</u>	<u>_____</u>	<u>FAC</u>	8. <u>Rub. spec</u>	<u>T</u>	<u>_____</u>	<u>FACU</u>
3. <u>Cornus can</u>	<u>20</u>	<u>Y</u>	<u>FAC-U</u>	9. <u>Vacc parv</u>	<u>T</u>	<u>_____</u>	<u>FACU</u>
4. <u>Aster mbr</u>	<u>5</u>	<u>_____</u>	<u>FAC</u>	10. <u>Rubus ped</u>	<u>2</u>	<u>_____</u>	<u>FAC</u>
5. <u>Vacc alba</u>	<u>8</u>	<u>_____</u>	<u>FAC</u>	11. <u>Vacc oval</u>	<u>3</u>	<u>_____</u>	<u>FAC</u>
6. <u>Vib edulis</u>	<u>5</u>	<u>_____</u>	<u>FAC-U</u>	12. <u>_____</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>

Total Sapling/Shrub Cover: 8250% of total cover: 4120% of total cover: 16.4

Herb Stratum

	Abs.Cov.%	Dom?	Ind.		Abs. Cov.%	Dom?	Ind.
1. <u>Gymn dry</u>	<u>60</u>	<u>Y</u>	<u>MAC-U</u>	12. _____	_____	_____	_____
2. <u>Oxth sec</u>	<u>10</u>	_____	<u>FACU</u>	13. _____	_____	_____	_____
3. <u>Pyrola asa</u>	<u>8</u>	_____	<u>FACU</u>	14. _____	_____	_____	_____
4. <u>Moss uni</u>	<u>T</u>	_____	<u>FACU</u>	15. _____	_____	_____	_____
5. <u>Gal triflorum</u>	<u>2</u>	_____	<u>FAC</u>	16. _____	_____	_____	_____
6. <u>Erg arv</u>	<u>2</u>	_____	<u>FAC</u>	17. _____	_____	_____	_____
7. <u>Lut cord</u>	<u>T</u>	_____	<u>FACU</u>	18. _____	_____	_____	_____
8. <u>Triella tri</u>	<u>T</u>	_____	<u>FAC</u>	19. _____	_____	_____	_____
9. <u>Am exp</u>	<u>2</u>	_____	<u>FACU</u>	20. _____	_____	_____	_____
10. <u>Amly Alisfen</u>	<u>2</u>	_____	<u>FAC</u>	21. _____	_____	_____	_____
11. _____	_____	_____	_____	22. _____	_____	_____	_____

Total Herb Cover: 8650% of total cover: 4320% of total cover: 17.2

Circular 1/10-ac plot ☒ or other plot dimension: % of bare ground: 10
 % Cover of Wetland Bryophytes 0 % Total Cover of Bryophytes 100 %
 (where applicable)

Remarks: bare ground mostly littered

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)Total Number of Dominant Species Across All Strata: 5 (B)Percent of Dominant Species That are OBL, FACW, or FAC: 20% (A/B)

Prevalence Index worksheet:

Total % Cover of: Multiply by: OBL species — X1= —FACW species — X2= —FAC species 55 X3= 165FACU species 153 X4= 612UPL + NL species — X5= —Column Totals: 208 (A) 777 (B)Prevalence Index = B/A = 3.74

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%N Prevalence Index is ≤3.0N Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)N Problematic Hydrophytic Vegetation¹ (Explain)¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes ☐ No ☒

SOIL

Sampling Point #: 152

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (in.)	Horizon (opt.)	Soil Matrix		Redox Features				α, α dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-6	O _i								
6-18	B	10YR 2/2							20% cobbles

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- ☒ Histosol or Histel (A1) (≥ 18 " organic surface, sat'd during wet period of growing season)
- ☒ Histic Epipedon (A2) (8-18" organics, sat'd, underlain by mineral soil with chroma ≤ 2)
- ☒ Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____ " in this pit)
- ☒ Thick Dark Surface (A12)
- ☒ Alaska Gleyed (A13)
- ☒ Alaska Redox (A14)
- ☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change⁴ (TA4)
- ☒ Alaska Alpine Swales (TA5)
- ☒ Alaska Redox with 2.5Y Hue
- ☒ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ☒ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present)

Type: none

Depth (inches)

Drainage Class: WD

Soil Map Unit Name: _____

Hydric Soil Present? Yes _____ No ☒

Comments:

-
-
-

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1) ☒ Surface Soil Cracks (B6)
- ☒ High Water Table (A2) (w/in 12") ☒ Inundation Visible on Aerial Imagery (B7)
- ☒ Saturation (A3) (w/in 12") ☒ Sparsely Vegetated Concave Surface (B8)
- ☒ Water Marks (B1) ☒ Marl Deposits (B15)
- ☒ Sediment Deposits (B2) ☒ Hydrogen Sulfide Odor (C1) (w/in 12")
- ☒ Drift Deposits (B3) ☒ Dry-Season Water Table (C2) (w/in 24")
- ☒ Algal Mat or Crust (B4) ☒ Other (explain)
- ☒ Iron Deposits (B5)

Secondary Indicators (at least 2 are required)

- ☒ Water-Stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ☒ Presence of Reduced Iron (C4) (pos. α, α or soil color change w/in 12")
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3) (w/in 24", can perch H₂O w/in 12")
- ☒ Microtopographic Relief (D4) (caused by water)
- ☒ FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes _____ No ☒ Depth of water (in.) _____

Water Table Present? Yes _____ No ☒ Depth to water (in.) _____

Seeping in at that depth but not yet filled?: _____

Saturation Present? Yes _____ No ☒ Depth to sat. (in.) _____

(includes capillary fringe) Epi Endo Unknown

Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 152: Soil, July 21, 2017



Site 152: Soil, July 21, 2017



Site 152: Vegetation, looking north on July 21, 2017



Site 152: Vegetation, looking south on July 21, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: PALMER VMS Borough/City: JNU/Haines Date: 7.21.2017
 Applicant/Owner: CONSTANTINE Sampling Point #: 154
 Investigator(s): D. Jewell, Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.42197 Long. 136.24547 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☒ Field Map #:
 Subregion (circle one): (SE) Southcentral Western Aleutian Interior Northern Landform: Slope (%): Aspect:
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: VPLAND
 Photo nos./descriptions: 562/564 SOIL 565-568 NGSW Camera #: MES Veg Type (Viereck Level 4 or other): CWTS
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <u> </u>	Is the sampled area within a wetland? Yes <u> </u> No <input checked="" type="checkbox"/> Remarks (e.g., marginal?): <u> </u>
Hydric Soil Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 Indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <i>Picea sitchensis</i>	10	Y	FACW	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	6	(A)
2. <i>Salix bartramica</i>	20	Y	FAC	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total Number of Dominant Species Across All Strata:	7 (B)
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Percent of Dominant Species That are OBL, FACW, or FAC:	86% (A/B)
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet:	
Total Tree Cover: <u>30</u>								Total % Cover of:	Multiply by:
50% of total cover: <u>15</u>								OBL species	X1= <u> </u>
20% of total cover: <u>6</u>								FACW species	X2= <u>70</u>
Sapling/Shrub Stratum (woody plants < 3" dbh)								FAC species	X3= <u>372</u>
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	FACU species	X4= <u>192</u>
1. <i>Salix bartramica</i>	60	Y	FAC	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	UPL + NL species	X5= <u>-(T)</u>
2. <i>Salix</i>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Column Totals:	207 (A) 634 (B)
3. <i>Cornus stolonifera</i>	20	Y	FAC	9. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index = B/A = <u>3.06</u>	
4. <i>Sambucus racemosa</i>	8	<u> </u>	FACW	10. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Hydrophytic Vegetation Indicators:	
5. <i>Viburnum edule</i>	5	<u> </u>	FACU	11. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Y Dominance Test is >50%	
6. <i>Rosa sp.</i>	1	<u> </u>	NL	12. <u> </u>	<u> </u>	<u> </u>	<u> </u>	N Prevalence Index is ≤3.0	
Total Sapling/Shrub Cover: <u>93</u>								Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
50% of total cover: <u>46.5</u>								Problematic Hydrophytic Vegetation ¹ (Explain)	
20% of total cover: <u>19.6</u>								¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
Herb Stratum								Hydrophytic Vegetation Present?	
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	Yes <input checked="" type="checkbox"/>	No <u> </u>
1. <i>Athyrium filix-femina</i>	7	<u> </u>	FAC	12. <i>Vaccinium vitis-idaea</i>	15	<u> </u>	FACW		
2. <i>Equisetum arvense</i>	15	Y	FAC	13. <i>Vitis dioica</i>	2	<u> </u>	FACW		
3. <i>Sium</i>	7	<u> </u>	FACU	14. <i>Horace lan</i>	1	<u> </u>	FACU		
4. <i>Cimicifuga racemosa</i>	15	Y	FACW	15. <i>Rosa</i>	1	<u> </u>	<u> </u>		
5. <i>Angelica</i>	5	<u> </u>	FACW	16. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
6. <i>Asarum canadense</i>	3	<u> </u>	FACU	17. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
7. <i>Gymnocladia dioica</i>	8	<u> </u>	FACU	18. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
8. <i>Viola sp.</i>	3	<u> </u>	<u> </u>	19. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
9. <i>Equisetum pratense</i>	15	Y	FACW	20. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
10. <i>Gnaphalium maculatum</i>	1	<u> </u>	FAC	21. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
11. <i>Calceolaria</i>	2	<u> </u>	FAC	22. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
Total Herb Cover: <u>87</u>									
50% of total cover: <u>43.5</u>									
20% of total cover: <u>17.4</u>									
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u> </u> % of bare ground: <u>60</u>									
% Cover of Wetland Bryophytes <u> </u> % Total Cover of Bryophytes <u>15</u> %									
(where applicable)									
Remarks: <u> </u>									



Site 154: Soil, July 21, 2017



Site 154: Soil, July 21, 2017



Site 154: Vegetation, looking north on July 21, 2017



Site 154: Vegetation, looking east on July 21, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: PALMER VMS Borough/City: INU Haines Date: 7.21.2017
 Applicant/Owner: Constantine Sampling Point #: 156
 Investigator(s): Doug Jewell; Cain Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.) 59.42150 Long. 136.24530 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☒ Field Map #:
 Subregion (circle one) (SE) Southcentral Western Aleutian Interior Northern Landform: Slope (%): Aspect:
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: UPLAND
 Photo nos./descriptions: 575/76 Soil; 577-580 NESW Camera #: MDS Veg Type (Viereck Level 4 or other): Music Herb
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: If no, explain. HGM type:
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	Is the sampled area within a wetland? Yes <u> </u> No <input checked="" type="checkbox"/> Remarks (e.g., marginal?): <u> </u>
Hydric Soil Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <u> </u>	No <input checked="" type="checkbox"/>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 Indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u> </u>	<u> </u>	<u> </u>	<u> </u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>0</u>	(A)
2. <u> </u>	<u> </u>	<u> </u>	<u> </u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total Number of Dominant Species Across All Strata:	<u>2</u> (B)
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>0</u> (A/B)
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet:	
Total Tree Cover: <u>0</u>								Total % Cover of:	
50% of total cover: <u> </u> 20% of total cover: <u> </u>								Multiply by:	
Sapling/Shrub Stratum (woody plants < 3" dbh)								OBL species <u>0</u> X1= <u>0</u>	
Abs. Cov. %	Dom?	Ind.	Abs. Cov. %	Dom?	Ind.	FACW species <u>30</u> X2= <u>60</u>			
1. <u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	FAC species <u>8</u> X3= <u>24</u>			
2. <u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	FACU species <u>145</u> X4= <u>580</u>			
3. <u> </u>	<u> </u>	<u> </u>	9. <u> </u>	<u> </u>	<u> </u>	UPL + NL species <u>0</u> X5= <u>0</u>			
4. <u> </u>	<u> </u>	<u> </u>	10. <u> </u>	<u> </u>	<u> </u>	Column Totals: <u>183</u> (A) <u>664</u> (B)			
5. <u> </u>	<u> </u>	<u> </u>	11. <u> </u>	<u> </u>	<u> </u>	Prevalence Index = B/A = <u>3.63</u>			
6. <u> </u>	<u> </u>	<u> </u>	12. <u> </u>	<u> </u>	<u> </u>				
Total Sapling/Shrub Cover: <u>0</u>									
50% of total cover: <u> </u> 20% of total cover: <u> </u>									
Herb Stratum								Hydrophytic Vegetation Indicators:	
Abs. Cov. %	Dom?	Ind.	Abs. Cov. %	Dom?	Ind.	N Dominance Test is >50%			
1. <u>Epi ang</u>	<u>60</u>	<u>Y</u>	<u>FACU 12 Carex sp.</u>	<u>5</u>	<u> </u>	N Prevalence Index is ≤3.0			
2. <u>Her lan</u>	<u>20</u>	<u> </u>	<u>FACU 13 Calcan</u>	<u>5</u>	<u>FAC</u>	N Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)			
3. <u>Dole glan</u>	<u>30</u>	<u> </u>	<u>FACU 14 grass sp. 1 @</u>	<u>5</u>	<u> </u>	N Problematic Hydrophytic Vegetation ¹ (Explain)			
4. <u>Thal occ</u>	<u>10</u>	<u> </u>	<u>FACU 15 grass sp. 1 @</u>	<u>3</u>	<u> </u>	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.			
5. <u>Epi an</u>	<u>T</u>	<u> </u>	<u>FAC 16</u>	<u> </u>	<u> </u>				
6. <u>Elymus gla</u>	<u>40</u>	<u>Y</u>	<u>FACU 17</u>	<u> </u>	<u> </u>				
7. <u>Urt. dio</u>	<u>15</u>	<u> </u>	<u>FACU 18</u>	<u> </u>	<u> </u>				
8. <u>Grum macr</u>	<u>3</u>	<u> </u>	<u>FAC 19</u>	<u> </u>	<u> </u>				
9. <u>Ang gen</u>	<u>T</u>	<u> </u>	<u>FACU 20</u>	<u> </u>	<u> </u>				
10. <u>Trichal euro</u>	<u>T</u>	<u> </u>	<u>FACU 21</u>	<u> </u>	<u> </u>				
11. <u>Solidago lep</u>	<u>T</u>	<u> </u>	<u>FACU 22</u>	<u> </u>	<u> </u>				
Total Herb Cover: <u>196</u>								Hydrophytic Vegetation Present? Yes <u> </u> No <input checked="" type="checkbox"/>	
50% of total cover: <u>98</u> 20% of total cover: <u>39.2</u>									
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u> </u> % of bare ground: <u>0</u>									
% Cover of Wetland Bryophytes <u> </u> % Total Cover of Bryophytes <u> </u>									
Remarks: <u> </u>									



Site 156: Soil, July 21, 2017



Site 156: Soil, July 21, 2017



Site 156: Vegetation, looking north on July 21, 2017



Site 156: Vegetation, looking south on July 21, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palma VMS Borough/City: JNU / Haines Date: 7.22.2017
 Applicant/Owner: Constantine Sampling Point #: 157
 Investigator(s): Doug Jewell, Erin Cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.38641 Long. 136.37317 ± ' NAD 83 Recorded on GPS #: _____ Marked on map? _____ Field Map #: _____
 Subregion (circle one) SE Southcentral Western Aleutian Interior Northern Landform: depression Slope (%): _____ Aspect: _____
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: UPLAND
 Photo nos./descriptions: 582/83 soil; 584-587 NBSW Camera #: M05 Veg Type (Viereck Level 4 or other): DAWTS
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: _____ No: _____ If no, explain. HGM type: N/A
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes _____	No <u>✓</u>	Is the sampled area within a wetland? Yes _____ No <u>✓</u> Remarks (e.g., marginal?):
Hydric Soil Present?	Yes _____	No <u>✓</u>	
Wetland Hydrology Present?	Yes _____	No <u>✓</u>	

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")

Species	Cov.%	Dom?	Ind.	Species	Cov.%	Dom?	Ind.
1. _____	_____	_____	_____	5. _____	_____	_____	_____
2. _____	_____	_____	_____	6. _____	_____	_____	_____
3. _____	_____	_____	_____	7. _____	_____	_____	_____
4. _____	_____	_____	_____	8. _____	_____	_____	_____

Total Tree Cover: 0

50% of total cover: _____

20% of total cover: _____

Sapling/Shrub Stratum (woody plants < 3" dbh)

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. <u>Alnus sin</u>	<u>8</u>	<u>Y</u>	<u>FAC</u>	7. _____	_____	_____	_____
2. <u>Salix sitch</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	8. _____	_____	_____	_____
3. <u>Ople hor</u>	<u>7</u>	<u>Y</u>	<u>FACU</u>	9. _____	_____	_____	_____
4. _____	_____	_____	_____	10. _____	_____	_____	_____
5. _____	_____	_____	_____	11. _____	_____	_____	_____
6. _____	_____	_____	_____	12. _____	_____	_____	_____

Total Sapling/Shrub Cover: 2550% of total cover: 12.520% of total cover: 5

Herb Stratum

Species	Abs.Cov.%	Dom?	Ind.	Species	Abs.Cov.%	Dom?	Ind.
1. <u>Artemisia dio</u>	<u>50</u>	<u>Y</u>	<u>UPL</u>	12. <u>Gray fl - fern</u>	<u>0</u>	_____	<u>FAC</u>
2. <u>Sax. lyalli</u>	<u>2</u>	_____	<u>FACW</u>	13. <u>Sen. triang</u>	<u>0</u>	_____	<u>FACW</u>
3. <u>Val sit</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	14. <u>Ver vir</u>	<u>7</u>	_____	<u>FAC</u>
4. <u>Epi cil</u>	<u>2</u>	_____	<u>FAC</u>	15. <u>Her lan</u>	<u>15</u>	<u>Y</u>	<u>FACU</u>
5. <u>Petanth frig</u>	<u>0</u>	_____	<u>FACW</u>	16. <u>Dry exp</u>	<u>3</u>	_____	<u>FAC-U</u>
6. <u>Epi arx</u>	<u>5</u>	_____	<u>FAC-U</u>	17. <u>Cal cat</u>	<u>3</u>	_____	<u>FAC</u>
7. <u>Vrt dio</u>	<u>15</u>	<u>Y</u>	<u>FAC-U</u>	18. <u>grass - sp</u>	<u>2</u>	_____	_____
8. <u>Stellaria caly</u>	<u>2</u>	_____	<u>FACW</u>	19. _____	_____	_____	_____
9. <u>Tellima grand</u>	<u>8</u>	_____	<u>FAC-U</u>	20. _____	_____	_____	_____
10. <u>Sanguinaria</u>	<u>10</u>	_____	<u>FACW</u>	21. _____	_____	_____	_____
11. <u>Osm chil</u>	<u>3</u>	_____	<u>FAC-U</u>	22. _____	_____	_____	_____

Total Herb Cover: 17150% of total cover: 85.520% of total cover: 34.2

Circular 1/10-ac plot ✓ or other plot dimension: _____ % of bare ground: 5
 % Cover of Wetland Bryophytes 0 % Total Cover of Bryophytes 100 %
 (where applicable)

Remarks:

4/3 160k up saucina in hollow

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC:	<u>3</u> (A)
Total Number of Dominant Species Across All Strata:	<u>7</u> (B)
Percent of Dominant Species That are OBL, FACW, or FAC:	<u>43%</u> (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	X1= _____
FACW species	X2= <u>60</u>
FAC species	X3= <u>174</u>
FACU species	X4= <u>224</u>
UPL + NL species	X5= <u>250</u>
Column Totals:	<u>194</u> (A) <u>708</u> (B)

Prevalence Index = B/A = 3.65

Hydrophytic Vegetation Indicators:

<u>N</u> Dominance Test is >50%
<u>N</u> Prevalence Index is ≤3.0
<u>✓</u> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
<u>N</u> Problematic Hydrophytic Vegetation ¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes _____ No ✓

SOIL

Sampling Point #: 157

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (in.)	Horizon (opt.)	Soil Matrix		Redox Features				a,a dip. (pos/ neg)	Remarks (or use comment number)
		Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-2	O _i								
2-4	O _e								
4-21	B	5Y2.5/1		7.5YR5/6	<5			SaL	neg 15% gravels

¹Type: C = Concentration, D = Depletion, RM = Reduced Matrix, CS=Coated Sand Grains ²Location: PL = Pore Lining, RC = Root Channel, M = Matrix

Hydric Soil Indicators (check ones that apply, measure from top of mineral layers unless otherwise noted):

Standard Indicators:

- ☒ Histosol or Histel (A1) (≥16" organic surface, sat'd during wet period of growing season)
- ☒ Histic Epipedon (A2) (8-16" organics, sat'd, underlain by mineral soil with chroma ≤2)
- ☒ Hydrogen Sulfide (A4) (within 12" of ground surface; @ _____ in this pit)
- ☒ Thick Dark Surface (A12)
- ☒ Alaska Gleyed (A13)
- ☒ Alaska Redox (A14)
- ☒ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils³:

- ☒ Alaska Color Change⁴ (TA4)
- ☒ Alaska Alpine Swales (TA5)
- ☒ Alaska Redox with 2.5Y Hue
- ☒ Alaska Gleyed without Hue 5Y or Redder Underlying Layer
- ☒ Other (e.g., see p.91 of 2007 Supplement; explain in Remarks)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Remarks.

Restrictive Layer (if present)

Type: none

Depth (inches) _____

Drainage Class: WD

Soil Map Unit Name: _____

Hydric Soil Present?

Yes _____ No ☒

Comments:

-
-
-

HYDROLOGY

Wetland Hydrology Indicators (check ones that apply, measure from soil surface):

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2) (w/in 12")
- ☒ Saturation (A3) (w/in 12")
- ☒ Water Marks (B1)
- ☒ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☒ Iron Deposits (B5)
- ☒ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☒ Sparsely Vegetated Concave Surface (B8)
- ☒ Marl Deposits (B15)
- ☒ Hydrogen Sulfide Odor (C1) (w/in 12")
- ☒ Dry-Season Water Table (C2) (w/in 24")
- ☒ Other (explain)

Secondary Indicators (at least 2 are required)

- ☒ Water-Stained Leaves (B9)
- ☒ Drainage Patterns (B10)
- ☒ Oxid'd Rhizospheres on Living Roots (C3) (within 12")
- ☒ Presence of Reduced Iron (C4) (pos. a,a or soil color change w/in 12")
- ☒ Salt Deposits (C5)
- ☒ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ Shallow Aquitard (D3) (w/in 24", can perch H₂O w/in 12")
- ☒ Microtopographic Relief (D4) (caused by water)
- ☒ FAC Neutral Test (D5) (# OBL+FACW dominants > # FACU+UPL dominants)

Field Observations (in. from ground surface):

Surface Water Present? Yes _____ No ☒ Depth of water (in.) _____

Water Table Present? Yes _____ No ☒ Depth to water (in.) _____

Seeping in at that depth but not yet filled?: _____

Saturation Present? Yes _____ No ☒ Depth to sat. (in.) _____

(includes capillary fringe) Epi Endo Unknown

Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



Site 157: Soil, July 21, 2017



Site 157: Soil, July 21, 2017



Site 157: Vegetation, looking north on July 21, 2017



Site 157: Vegetation, looking west on July 21, 2017

WETLAND DETERMINATION DATA FORM - Alaska Region

Project: Palmer Borough/City: JNU, Haines Date: 7.22.2017
 Applicant/Owner: Constantine Sampling Point #: 181
 Investigator(s): Dns Owell, edn cunningham Firm: HDR Alaska, Inc.
 Lat. (dec.): 59.42246 Long. 136.23981 ± ' NAD 83 Recorded on GPS #: ☒ Marked on map? ☐ Field Map #:
 Subregion (circle one): SE Southcentral Western Aleutian Interior Northern Landform: Slope (%): Aspect:
 Local relief: Shape across slope: linear / convex / concave Shape up/downslope: linear / convex / concave NWI classification: RFOY/SS15
 Photo nos./descriptions: 765/66 Soil; 767-770 NEW Camera #: MOS Veg Type (Viereck Level 4 or other): Open Spruce Forest
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes: ☒ No: ☐ If no, explain. HGM type: R. minor
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? If needed, explain answers here.

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the sampled area within a wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Remarks (e.g., marginal?):
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		

VEGETATION (Use scientific names.) Estimate absolute % cover (not relative cover). % can total >100%. Use 2012 indicator status.

Tree Stratum (dbh ≥ 3")								Dominance Test worksheet:	
Species	Cov. %	Dom?	Ind.	Species	Cov. %	Dom?	Ind.	Number of Dominant Species That are OBL, FACW, or FAC:	
1. <u>Picea Sitch</u>	<u>35</u>	<u>Y</u>	<u>FACU</u>	5. <u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>4</u>	(A)
2. <u>Picea glauca</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	6. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Total Number of Dominant Species Across All Strata:	<u>5</u> (B)
3. <u> </u>	<u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Percent of Dominant Species That are OBL, FACW, or FAC:	<u>80</u> (A/B)
4. <u> </u>	<u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>	<u> </u>	Prevalence Index worksheet:	
Total Tree Cover: <u>35</u>								Total % Cover of:	
50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>								Multiply by:	
Sapling/Shrub Stratum (woody plants < 3" dbh)								OBL species <u> </u> X1= <u> </u>	
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	FACW species <u>3</u> X2= <u>6</u>	
1. <u>Viburnum edule</u>	<u>7</u>	<u> </u>	<u>FACU</u>	7. <u>Rosa acic</u>	<u>5</u>	<u> </u>	<u>FACU</u>	FAC species <u>142</u> X3= <u>426</u>	
2. <u>Rosa nutkana</u>	<u>7</u>	<u> </u>	<u>FACU</u>	8. <u>Shepherdia can</u>	<u>3</u>	<u> </u>	<u>FACU</u>	FACU species <u>94</u> X4= <u>384</u>	
3. <u>Salix bar</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>	9. <u>Salix</u>	<u>2</u>	<u> </u>	<u> </u>	UPL + NL species <u>9</u> X5= <u>45</u>	
4. <u>Cornus can</u>	<u>5</u>	<u> </u>	<u>FACU</u>	10. <u>Cornus</u>	<u>2</u>	<u> </u>	<u> </u>	Column Totals: <u>250</u> (A) <u>861</u> (B)	
5. <u>Rub. arc</u>	<u>5</u>	<u> </u>	<u>FAC</u>	11. <u>Amel. aln</u>	<u>7</u>	<u> </u>	<u>UPL</u>	Prevalence Index = B/A = <u>3.4</u>	
6. <u>Cornus sbl</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	12. <u>Salix x glau</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>		
Total Sapling/Shrub Cover: <u>89</u>									
50% of total cover: <u>44.5</u> 20% of total cover: <u>17.8</u>									
Herb Stratum								Hydrophytic Vegetation Indicators:	
Species	Abs. Cov. %	Dom?	Ind.	Species	Abs. Cov. %	Dom?	Ind.	Dominance Test is >50% <u>Y</u>	
1. <u>Equis. arx</u>	<u>80</u>	<u>Y</u>	<u>FAC</u>	12. <u>Viola sp</u>	<u>2</u>	<u> </u>	<u> </u>	Prevalence Index is ≤3.0 <u>N</u>	
2. <u>Pyrola asca</u>	<u>7</u>	<u> </u>	<u>FACU</u>	13. <u>Strepto amp</u>	<u>3</u>	<u> </u>	<u>FACU</u>	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u>N</u>	
3. <u>Geo. liv</u>	<u>3</u>	<u> </u>	<u>FACU</u>	14. <u>Gymn. dry</u>	<u>3</u>	<u> </u>	<u>FACU</u>	Problematic Hydrophytic Vegetation ¹ (Explain) <u>N</u>	
4. <u>Heut. cur</u>	<u>1</u>	<u> </u>	<u>FACU</u>	15. <u>Sag. calif</u>	<u> </u>	<u> </u>	<u> </u>		
5. <u>Gal. triflor</u>	<u>2</u>	<u> </u>	<u>FAC</u>	16. <u>Tellima grandif</u>	<u>5</u>	<u> </u>	<u>FACU</u>		
6. <u>Artem. tell</u>	<u>2</u>	<u> </u>	<u>FACU</u>	17. <u>Cal. calif</u>	<u>2</u>	<u> </u>	<u>FAC</u>		
7. <u>Tara. off</u>	<u>3</u>	<u> </u>	<u>FACU</u>	18. <u>Artem. sec</u>	<u>3</u>	<u> </u>	<u>FACU</u>		
8. <u>Epi. ang</u>	<u>3</u>	<u> </u>	<u>FACU</u>	19. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
9. <u>Urtica bor</u>	<u>2</u>	<u> </u>	<u>FACU</u>	20. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
10. <u>Plant. didym</u>	<u>3</u>	<u> </u>	<u>FACU</u>	21. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
11. <u>Tiarella tri</u>	<u>3</u>	<u> </u>	<u>FAC</u>	22. <u> </u>	<u> </u>	<u> </u>	<u> </u>		
Total Herb Cover: <u>126</u>								Hydrophytic Vegetation Present? Yes <u>Y</u> No <u> </u>	
50% of total cover: <u>63</u> 20% of total cover: <u>25.2</u>									
Circular 1/10-ac plot <input checked="" type="checkbox"/> or other plot dimension: <u> </u> % of bare ground: <u>T</u>									
% Cover of Wetland Bryophytes <u>0</u> % Total Cover of Bryophytes <u>00</u> %									
Remarks:									



Site 181: Soil, July 21, 2017



Site 181: Soil, July 21, 2017



Site 181: Vegetation, looking east on July 21, 2017



Site 181: Vegetation, looking west on July 21, 2017

Appendix B

Observation Points – Photographs

July 19-22, 2017

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Site 81: Waterbody, looking south on July 19, 2017



Site 81: Waterbody, looking west on July 19, 2017



Site 82: Upland, looking north on July 19, 2017



Site 82: Upland, looking east on July 19, 2017



Site 83: Waterbody, looking north on July 19, 2017



Site 83: Waterbody, looking west on July 19, 2017



Site 99: Vegetation, looking east on July 19, 2017



Site 99: Vegetation, looking west on July 19, 2017



Site 109: Stream crossing, looking upstream on July 19, 2017



Site 109: Stream crossing, looking downstream on July 19, 2017



Site 110: Vegetation, looking east on July 19, 2017



Site 110: Dry swale, looking south on July 19, 2017



Site 111: Vegetation, looking north on July 19, 2017



Site 111: Seep flowing at this site on July 19, 2017



Site 112: Vegetation, looking south on July 19, 2017



Site 112: Seep at this site on July 19, 2017



Site 123: Waterbody, looking upslope on July 19, 2017



Site 123: Waterbody, looking downslope on July 19, 2017



Site 124: Waterbody on July 19, 2017



Site 124: Waterbody on July 19, 2017



Site 126: Waterbody adjacent to Site 125 looking north on July 20, 2017



Site 126: Waterbody adjacent to Site 125 looking east on July 20, 2017



Site 133: Wetland vegetation, looking west on July 20, 2017



Site 133: Inundated strip along forest edge at this site, July 20, 2017



Site 136: Looking upstream on tributary of Glacier Creek on July 21, 2017



Site 136: Looking downstream toward Glacier Creek on July 21, 2017



Site 136: Looking across stream channel, July 21, 2017



Site 136: Stream channel looking south on July 21, 2017



Site 137: Vegetation, looking north on July 21, 2017



Site 137: Vegetation, looking east on July 21, 2017



Site 138: Looking upstream on side channel of Glacier Creek tributary, July 21, 2017



Site 138: Looking downstream at tributary of Glacier Creek on July 21, 2017



Site 139: Upland vegetation, looking east on July 21, 2017



Site 139: Upland vegetation, looking west on July 21, 2017



Site 140: Upland vegetation, looking south on July 21, 2017



Site 140: Upland vegetation, looking west on July 21, 2017



Site 141: Upland vegetation; no flow or sign of flow, looking upslope on July 21, 2017



Site 141: Upland vegetation; no flow or sign of flow, looking across slope on July 21, 2017



Site 142: Stream crossing, looking upstream on July 21, 2017



Site 142: Stream crossing, looking downstream on July 21, 2017



Site 149: Upland vegetation; looking north on July 21, 2017



Site 149: Upland vegetation; looking east on July 21, 2017



Site 150: Upland vegetation; looking north on July 21, 2017



Site 150: Upland vegetation; looking south on July 21, 2017



Site 151: Recently disturbed upland; looking east on July 21, 2017



Site 151: Recently disturbed upland; looking south on July 21, 2017



Site 153: Upland, vegetation looking north on July 21, 2017



Site 153: Upland, vegetation looking east along road cut on July 21, 2017



Site 155: Looking north at dry channel on July 21, 2017



Site 155: Looking south at dry channel on July 21, 2017



Site 163: Vegetation looking north on July 21, 2017



Site 163: Vegetation looking south on July 21, 2017



Site 164: Looking upstream on July 21, 2017



Site 164: Looking downstream on July 21, 2017



Site 165: Inundated backwater area (beaver activity), looking east on July 21, 2017



Site 165: Inundated backwater area (beaver activity), looking south on July 21, 2017



Site 166: Downstream of beaver dam, looking north on July 21, 2017



Site 166: Standing on beaver dam, photographer looking west on July 21, 2017



Site 167: Stream crossing, looking upstream on July 21, 2017



Site 167: Stream crossing, looking downstream on July 21, 2017



Site 168: Backwater from beaver activity, looking east on July 21, 2017



Site 168: Backwater from beaver activity, looking south on July 21, 2017



Site 169: Small seep on July 21, 2017



Site 169: Vegetation, looking west from small seep on July 21, 2017



Site 170: Seep, looking north on July 21, 2017



Site 170: Seep, looking south on July 21, 2017



Site 171: Stream channel, looking upstream on July 21, 2017



Site 171: Stream channel, looking downstream on July 21, 2017



Site 172: Vegetation, looking north on July 21, 2017



Site 172: Ponded area, looking south on July 21, 2017



Site 173: Inundated area (beaver activity), looking north on July 21, 2017



Site 173: Inundated area (beaver activity), looking east on July 21, 2017



Site 174: Edge of inundation (beaver activity), looking east on July 21, 2017



Site 174: Inundation at this site, looking south on July 21, 2017



Site 175: Small feeder stream, looking upstream on July 21, 2017



Site 175: Looking upstream on main stream channel on July 21, 2017



Site 176: Vegetation at upland site, looking east on July 21, 2017



Site 176: Vegetation at upland site, looking west on July 21, 2017



Site 178: Vegetation, looking north on July 21, 2017



Site 178: Small stream, looking downstream on July 21, 2017



Site 179: Pond, looking north on July 21, 2017



Site 179: Looking west on July 21, 2017



Site 180: Looking upstream from Bear Creek bridge on July 21, 2017



Site 180: Looking downstream from Bear Creek bridge on July 21, 2017



Site 182: Vegetation, looking north on July 21, 2017



Site 182: Vegetation, looking east on July 21, 2017



Site 183: Vegetation, looking north on July 21, 2017



Site 183: Vegetation, looking east on July 21, 2017